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CHILD DEVELOPMENT



This number includes reports of methods of study in child psychology; of attitudes toward behavior problems; and of adolescent crushes.



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CHILD DEVELOPMENT

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Ontogeny of Motility of the Face¹

L. KWINT

OF THE total equipment of neuro-psychical potentialities motility is one of the principal components by means of which an individual as a whole reacts to his environment. Motility acquires a special significance in childhood being nearly the only indicator of the rate and character of the general development.

Therefore the motor sphere as a subject of research has recently attracted the attention not only of clinical and psycho-neurological investigators but mostly of workers of various branches of the pedagogical section.

When studying motility the problem of motor ability is of special interest. In accordance with the opinion of most investigators regarding general ability under motor ability we understand a combination of capacities that determine the motor activity of a human organism, its maximum and minimum capacity of readjustment to new situations. We mean here the extent of specialization of motor manifestations and the range within which these manifestations vary respectively according to the different requirements of the environment. "We say that a person has motor ability if he can

easily use his motor apparatus for various connected movements, using instruments as a help and perfecting his movements by exercise. A person is defective in his motor ability if he cannot use his limbs, his mechanism of statics, correct innervation, and is limited by a small number of simple motor connections" (4).

Motor ability, its character, volume, and extent is in close connection with the development of the general constitutional capacities of the growing organism evolving under the stimulating influence of its environment. In accordance with this conception when working out the metrical scale, it is correct to select the tests according to the natural evolution of motor capacity. Graded according to age such a scale could serve as a scientific method of investigating innate abilities for certain movements but not habits acquired through individual experience in play or work by special exercises. In this respect, the natural development of mimic motility of the face deserves attention.

Mimics are undoubtedly an emphatic correlator of the evolutionary state of the neuro-psychic sphere. With the development of the latter mimic movements become refined and perfected. This may be seen when comparing the mimics of species of various zoological grades; this may also

¹ Section of Psycho-neurology of Child's Age, at the Ukrainian Psycho-neurological Institute.

be observed by comparing the mimic movements of a savage and civilized man. Animals have mostly reflex mimic movements directly affected by stimuli of various receptive organs or by internal organic impulses of a general character. More complex mimic movements of a conditioned reflex nature observed in animals are poor and unvarying. The mimic movements of anthropomorphous monkeys become more various and complete than the mimic movements of animals of a preceding evolutionary stage, the mimic movements of savages are more complex than those of monkeys and civilized people have finer and more differentiated mimic movements than savages. We may note also age differences in mimics. Mantegazza (7) writes: "The mimics of a child are extensive but poor in shades, that of a more grown up child is extensive and rich enough in details, a young man's mimics are distinguished by extent and amplitude of contents and especially by effusion, the mimics of an adult are more balanced, more rich in details than in strength of expression, gradually they become less effusive; finally the mimics of an old man are weak, indefinite and very concentric."

In general, we may state that the development and perfection of mimic movements take place simultaneously with the evolution of the neuro-psychic sphere, beginning with the early stages of childhood, and that with the involutive changes of the personality in senile age the mimic movements are subjected to a reverse development. A number of scientific investigations are devoted to the study of mimics

as expressive motility (Piderit (8), Darwin (3), Hughes (5), Bechterew (1), Sikorsky (9), Bell (2), Kirchhoff (6)). The task of this paper is to investigate not expressive mimic belonging to the extrapyramidal motility but voluntary movements of the mimic musculature connected with the activity of the pyramidal, neokinetic system. Therefore, we consider it necessary first of all to determine the conception of voluntary movements. Voluntary movements differ from involuntary ones, as they contain a psychical moment. Genetically voluntary movements are connected with various kinds of involuntary movements as impulses, reflexes, instincts. The latter through interaction of the organism and its environment offer the personality various impressions. Emotions and images are subject to considerable modifications and form the so-called voluntary movements.

In childhood, the process of forming voluntary movements is determined by the so-called circular reaction expressed by automatic frequent repetition of certain casually performed movements connected with Kinesthesia affected by the latter.

"Something is added to an impulse of an involuntary movement transformed into a voluntary one," says Preyer, and something is lost when voluntary movements become involuntary." This something makes the purely psychical moments kinesthetic images, idea of the movements and their aims. In voluntary movements, there is from one part a component of volition activity conditioned by active consciousness as a special manifestation of a highly organized neokinetic

(pyramidal) system which serves as an apparatus for acquiring individual experience, and from the other part there is a component involuntary automatic motor mechanism connected with the extra pyramidal (paleokinetic) system dealing with the experience of the species of an organism and determining the formal moments of a movement; rate, skill and other qualities.

Analyzing motility in the aspect of evolution of the cortical and subcortical mechanism and their relations, we may state that the latter are in different functional proportions to each other in their ontogenetic development. With age the cortical mechanism gradually begins to dominate the subcortical.

In the motor activity of a child of preschool age the automatic elements are considerably expressed; the mechanism of voluntary control is not strong enough being in process of development. This is to be seen in the inaccuracy, inconstancy of the voluntary movements, inability for more or less durable motor efforts. The motor activity of a child of school age is characterized by an equal function of both voluntary and automatic mechanisms one balancing the other. The motor activity of a stripling, owing to the period of sex development revealing a new evolutionary stage, is subject to certain dissociations due to the general biological crisis of the age of puberty. The movements at this age become clumsy, angular and often inadequate. The motor mechanism of an adolescent towards the end of sex maturation in connection with the displacement and strengthening of

the cortical system becomes associated again; a certain harmony is established with a marked prevalence of cortical-pyramidal principles. The active interaction of the human organism and its environment is accomplished through a number of subsequently connected neuro-psychic phenomena the principal of which are perception, imagery and volition, the environment being the determinant source and point of application of voluntary movements. The latter forming the contents of various acts of behaviour are the general expression of volition which in its turn is directed by imagery originating in the receptive organs. The volitional processes are interactions of kinesthetic images affecting the centres of the motor system and modifying the existing movements long since frequently effected impulsively, reflexively, instinctively. Not only the stimuli of the concrete realities surrounding the person at that moment but the entire individual experience of a man is expressed in voluntary movements which are thus the result of empirical training through involuntary movements affecting kinesthetic images. At the same time voluntary movements express completely new acts of behaviour. Through the mentioned peculiarities voluntary movements become a special expression of the total equipment of a personality. In connection with age, motility develops in a more or less definite succession, but being a function of endogenic inherited tendencies and external conditions of environment it displays accordingly considerable individual fluctuations.

The evolution of motility takes

place simultaneously with the development of the nervous system. While the development of the cellular elements of the nervous system and the process of myelinization of conduction system are usually completed at the age of 3 the association fibers connecting the nervous cells of various centres of the cerebral cortex continue to develop and differentiate for a long time including the period of sex maturing and according to recent data even the mature age of thirty to forty years.

nearly all the possible simple movements of the facial musculature. In choosing the tests I was guided not by the myological architecture of the face, but by the real functional activity of the separate parts of facial musculature; voluntarily performed according to the respective images, as one complete psycho-physiological act. Verbal instructions with an easy description of all required movements are given to the tested person. At the same time the experimenter performs the necessary movement him-

TABLE 1
Age in years and sex of children tested

	AGE														TOTAL
	4	5	6	7	8	9	10	11	12	13	14	15	16		
Boys	6	10	12	20	18	32	30	20	10	32	16	16	8	230	
Girls	8	8	12	8	14	24	38	24	26	22	28	24	10	246	
Total	14	18	24	28	32	56	68	44	36	54	44	40	18	476	

The existence consequently of certain voluntary movements is determined not only by biomechanical conditions and physiological activity of the muscles but chiefly by the corresponding innervation. The appearance of certain voluntary movements of the growing human organism may indicate the cerebral development of the respective spheres. The conception of voluntary movements given here may be wholly applied to mimic psycho-motility the ontogeny of which is the subject of this paper.

In order to determine the principal tendencies and peculiarities of the development of voluntary mimic movements I have elaborated a special method comprising by means of tests

self and the tested person must control his own performance looking at a mirror.

The tests were given to 476 children of both sexes at the age of four to sixteen years inclusive. They were distributed according to age and sex in the way shown in table 1.

With respect to their physical condition, intellectual abilities and scholarship records, or progress in studies, children of an average development were selected. They were also carefully selected according to age, so that each definite age group was uniform. In each age group were children whose age did not deviate more or less than 4 months from the standard. For instance, children from seven

years eight months up to eight years four months belonged to the 8 year standard. Children whose age was more than four months above or below the standard age were not subjected to investigation.

Considering the results obtained we shall mention the data illustrating the age distribution of mimic movements performed synchronously and symmetrically. (See table 2.)

We give here the mean values of the quantity of performal movements

progressive tendency of the age evolution of mimic psychomotility.

Regarding the facial movements performed at different times, for the right and left sides separately, we observe a marked tendency to increase the number with the increase of the age level. This is illustrated in table 3.

The low figures here are evident. Of 16 movements of the symmetrical musculature of the face to be performed separately and monolaterally

TABLE 2
Age distribution of mimic movements

	AGE															
	4	5	6	7	8	9	10	11	12	13	14	15	16			
Number of movements.....	10.5	12.7	13.4	13.8	16.4	17.9	17.9	18.3	18.7	19	20	18.8	19.4			
Percentage.....	40.4	48.8	51.5	53.1	63.1	68.8	68.8	70.4	71.9	73.1	76.9	72.3	74.6			

TABLE 3
Increase in number of facial movements with increase in age

	AGE															
	4	5	6	7	8	9	10	11	12	13	14	15	16			
Number of movements.....	2.9	3.7	3.3	4.1	4.8	5.9	6	5.9	5.9	6.6	7.4	6.9	6.9			
Percentage.....	17.9	23.1	20.3	25.4	29.7	36.6	37.5	36.9	37.1	41.2	46.3	42.8	43.1			

for each age group separately. The obtained data reveal a certain regularity in the age distribution of the quantitative volume of voluntary movements of the facial musculature. This volume beginning at the age of four throughout all the subsequent age periods gradually and steadily increases, attaining its highest limit at the age of fourteen. At the ages of fifteen and sixteen years, we observe a slight decline in the number of possible, active mimic movements interrupting somewhat the mentioned

only a very limited number was available which varied in the investigated group of children; judging by the average data from three to seven movements or from eighteen to forty-six per cent. Subjecting the obtained data to a neuro-physiological analysis we may note that the increase of voluntary mimic motility in connection with age takes place simultaneously with ontogenetic development of respective innervation mechanisms, mostly of the sensory motor cortex. As has been mentioned, for the right

growth of movement an effective as well as a receptive apparatus must exist. According to the investigations of Jacob Bielschowsky and others in the cerebral cytoarchitecture the main internal layer of the cortex performs the effective functions and the external layer the receptive ones. This is confirmed by the data of the embryogeny showing a development of the internal cortical layer of corpus striatum and the external layer of the primary olfactory organs. The existence of certain voluntary movements shows the functional ability of the centrifugal as well as the centripetal element of the cortex. Being connected with such psychic moments as stimulation to movement, volitional initiative, formation of conceptions of movement and conscious designing of respective motor formulae voluntary movements depend upon the functions not only of the motor centres of the cerebral cortex but upon the frontal gyrus affecting the latter and forming the highest psychomotorium. The process of intercortical myelinization determining the functional capability begins in the association network of the frontal lobes of the cerebral cortex much later than in other sections. Our data consequently enable us to follow the gradual increase of functional plasticity in the primary and higher stages of the psycho-motor area belonging to the mimic musculature. It is noteworthy that mimic psychomotility as seen from the given tables, continues to increase quantitatively up to the period of sex maturing. At the ages of fifteen and sixteen years, we notice a slight decline in the number

of voluntary movements of the mimic musculature. This fact which at first sight appears paradoxical is, however, subjected to regularity of ontogeny of psycho-motility. The progressive development of the latter as well as the whole nervous system, does not cease or decrease during the age of puberty but acquires in connection with the changes due to sex maturation, certain qualitative peculiarities. In the age of puberty there is a certain reconstruction of the motor apparatus as a whole and the ability to master and commensurate movements is interrupted to some extent. Homburger explains this phenomenon by the fact that the central organs lag behind the growth of the motor organs in consequence of which there is a release of the primitive mechanisms. At this period there is an intensive development of the peripheral nerves of the growing organs and the cerebrum in its functions is somewhat retarded not being able to manage the great quantity of afferent stimulation coming along the extended system of peripheral neural connections from the growing organs causing the blood to flow from it to them. The mentioned functional decrease of the cerebral activity at this period depends upon a general decrease of hemoglobins in the blood causing anaemia of the cerebrum.

It seems that these peculiarities of the nervous system at the critical period may explain the decrease in quantity of voluntary movements of the facial muscles of the face observed at the ages of fifteen and sixteen years.

When investigating voluntary mimic movements with respect to their possi-

bility of being performed isolatedly on each side, we note the following peculiarities, besides the mentioned regularity of progressive increase in connection with age characteristic also for synchronous mimic movements. Most of the mentioned movements could not be performed on both sides to the same extent. The isolated movements of the symmetrical muscles or groups of facial muscles successfully performed on one side could not be done on the other side at all, or if performed they were fewer in number and less vigorous.

The same thing was observed in the cases when the face in a calm state did not show any asymmetry, and when the movements of respective mimic muscles were performed synchronously no signs of paralysis or paresis could be revealed. Thus for instance, if the tests such as lifting of the brows, contracting the brows, closing the lids, wrinkling the eyes and lifting of the upper lip were successfully performed synchronously, an isolated asynchronous performance of the mentioned movements could be carried out only on one side. Such a type of performance we call dynamic *anisomimia*. This circumstance deserves special consideration when a clinical investigation of nervous patients is carried on, especially in cases concerning the organic forms of cerebral pathology. An isolated cessation of the functions of the symmetrical muscles serves as a fundamental point in diagnostic inferences of the localization of the process. In the initial stages of the growing illness great importance is attached to innervating asymmetry. It is natural that the

mentioned peculiarities of dynamic anisomimia of physiological nature must be taken into consideration in neuroclinical practice in order to prevent diagnostic mistakes. The neurophysiological meaning of this peculiarity is that the functional development of the cerebral cortex is not equal in both hemispheres of the cerebrum. This asymmetry of cortical differentiation though showing a tendency of a certain levelling, in connection with age remains invariable regarding certain facial muscles in the later periods of development with striplings and adolescents and, according to our observations not systematized yet even with adults.

Regarding the movements of facial musculature performed not simultaneously on either side separately we must note that in all our investigations of age groups they are exceedingly limited in number, varying between three and seven out of 16 given movements while the symmetrical and synchronously performed movements vary from nine to twenty out of 26 movements.

The movements of the mimic musculature in most cases not impelled in their development by external stimuli reveal emphatically a natural increase of differentiations resulting from the regularity of the intercortical evolution. The range of possible isolated, monolateral movements of the symmetrical facial musculature may be increased undoubtedly by special exercises as it is done with other muscular groups, particularly the organs of labor activity and movement. But artificially developed movements resulting from an active interaction

of the organism and its environment bear the character of acquired habits. Such habits are the subject of most published methods of investigating motor ability. Naturally, in the light of the above mentioned data and considerations such methods do not explain motor ability essentially. Active movements of mimic musculature since they are but little exercised under the usual conditions of individual development, excepting the facial muscles complexly participating in expressional movements, are the real correlators of the natural psychomotor evolution.

After stating the general tendencies concerning the quantity of voluntary movements of mimic musculature in connection with age, we shall consider separate movements in their evolutionary aspects.

If we consider sixty to seventy per cent of positive performance as the index of age conformity with certain movements, we shall be able to give the following ontogenetic characteristics of the investigated mimic movements. By symmetrical and synchronic movements the following data are obtained.

The following movements are performed in quantity not less than two-thirds of cases for each age group.

Beginning with the age of 4: lifting of the brows; slight closing of the lids; screwing up of the eye; tight closing of the lids; closing of the lips; setting the lips as if playing a brass instrument; protruding the lips forward as if pronouncing the letter "o"; blowing out the cheeks; exposing the teeth.

Beginning with the age of 5: drawing down the lower lip.

From 6 years: protruding the lips as if whistling; lifting the corners of the mouth upwards and outwards.

From 7 years: contracting the brows; turning out the lower lip; lifting the chin upwards.

From 8 years: pursing the corners of the mouth towards the midline.

From 9 years: lifting the upper lip; drawing the corners of the mouth, downwards and backwards.

From 16 years: forming a transversal pucker on the bridge of the nose.

Some movements were performed by a small number of children, so that we may consider them not characteristic, i.e., casual for children of normal development. These movements were: drawing back the skin of the head; contracting the nostrils; expanding the nostrils; drawing the ears forward; drawing the ears up; drawing the ears back.

As for the separate movements of mimic musculature which are to be performed asynchronously, i.e., alternately on each side separately, the respective results are given in the following brief record.

Active asynchronous movements: screwing up one eye and tight closing of one eye-lid are performed from the age of four years; slight closing of one eye-lid from 5 years; alternate blowing out of one cheek from 7 years; sideward contracting of the face from 8 years; lifting the corner of the mouth upward and outward from 9 years; exposing the teeth from one side from 10 years. The movements performed by a very small per cent of children included: lifting one brow upwards; drawing one corner

of the mouth towards the midline; lifting the outer part of upper lip; and drawing one corner of the mouth downward and backward. The movements not mastered by children with very few exceptions are: contracting one brow; drawing one corner of the mouth downward; and drawing one ear back. The movements never performed by any children with no exceptions are: drawing one ear forward; and lifting one ear upward.

The data of the ontogenetic analysis of facial motility enable us to represent the equipment of active mimic movements by separate investigated age groups in a graded scale. For this purpose only those movements were included in each age series that were performed by 75 per cent of children of respective ages.

For four to five years, 4th grade

1. Lifting of the brows
2. Slight closing of the lids
3. Screwing up the eye
4. Tight closing of the lids
5. Closing of the lips
6. Setting the lips as if playing a brass instrument
7. Protruding the lips forward as if pronouncing the letter "o"
8. Blowing out of the cheeks
9. Exposing the teeth

For six years, 5th grade

10. Protruding the lips forward as if whistling

For seven years, 6th grade

11. Contracting the brows
12. Screwing up one eye
13. Tight closing of the lids of one eye
14. Slight closing of the lids of one eye

For eight years, 7th grade

15. Turning out the lower lip
16. Drawing down the lower lip

17. Lifting the corners of the mouth upward and outward
18. Drawing the corners of the mouth towards the midline

For nine years, 8th grade

19. Lifting the chin upwards
20. Blowing out one cheek

For ten to twelve years, 9th grade

21. Drawing the corners of the mouth downwards and backward
22. Contracting the face sideward

For thirteen to fifteen years, 10th grade

23. Lifting one corner of the mouth upwards and outwards
24. Exposing the teeth from one side

For sixteen years, 11th grade

25. Lifting the upper lip
26. Forming a transversal pucker on the bridge of the nose

The above items of the voluntary mimic movements and their age distribution are not only emphatic illustrations of the before mentioned considerations about the progressive tendencies of facial motility and correlation of motility with neuro-psychical development but they may also have practical application. They may serve as a standard of orientation in clinical practice, in the topical diagnosis of organic neuro-pathological variations in the initial stages of plasticity in cases of constitutional neuro-psyche degeneration, and especially in pedagogical practice when establishing a level of general psycho-motility development.

In order to verify the given graded scale of mimic psycho-motility we consider it of interest to mention here some observations of mentally deficient children in various extent who were tested by the method described

in this paper, besides being subjected to psycho-neurological, somatological and sociological investigations. The application of this method as well as the analysis and interpretation of the results obtained, may be seen on concrete examples.

As illustrations we chose material of the oligophrenical type which are mostly deficient in their mental development as well as general motility.

L., a boy of 11 years, 5 months, dull average physical health, displastic constitution with a displastic type of face, left handed, tongue-tied, dull carriage, inexpressive mimics, imbecile.

The scheduled results of investigating the active mimic movements are the following:

SERIES	MOVEMENTS PERFORMED	PER CENT OF TEST
<i>years</i>		
4-5	7	0.78
6	1	1
7	0	0
8	0	0
9	0	0
10-12	0	0
13-15	0	0
16	0	0
Total performance.....	8	

The formula for mimic psycho-motility is

$$4 - 0.22 + 1 = 4.78$$

Considering the age of the tested equal to 11 years, 5 months, we could expect the performance of tests of 9th Grade for eleven to twelve years. From the results obtained, we may state a retardation in this case according to the formula:

$$9 - 4.78 = 4.22$$

Expressing it in the language of the metric scale, we state a mimic psycho-motility development corresponding to the 4.78 grade, consequently, a retardation in respect of ability for creating voluntary movements of the facial musculature in 4.22 grade.

Z. B., a schoolboy of the first group, 9 years old. Unsatisfactory scholarship records, dull, easily excited, physical health unsatisfactory, asthenic constitution, displastic features. Type of face cerebral-respiratory, dull carriage, inexpressive mimic capacity, stuttering in his speech, intellectual development by Binet and Simon equal to 7.8 year standard. Debilitas mentis. Test of mimic psycho-motility gave the following results.

SERIES	MOVEMENTS PERFORMED	PER CENT OF TEST
<i>years</i>		
4-5	6	0.67
6	1	1
7	0	0
8	0	0
9	1	0.5
Total performance.....	8	

Formula of mimic psycho-motility:

$$4 - 0.33 + 1 + 0 + 0 + 0.5 = 5.17$$

Retardation:

$$8 - 5.17 = 2.83$$

L. B., a schoolboy of second group, 10 years old. Scholarship records—unsatisfactory, exceedingly lively and easily excited. Average health. Asthenic displastic constitution. Carriage, mimics and speech without any

peculiarities. Intellectually, sub-normal.

In respect of active mimic movements we get the following results.

SERIES	MOVEMENTS PERFORMED	PER CENT OF TEST
<i>years</i>		
4-5	9	1.00
6	1	1.00
7	2	0.50
8	2	0.50
9	1	0.50
10-12	0	0.00
13-15	0	0.00
16	2	1.00
Total performance.....	17	

The formula of development of mimic psycho-motility:

$$4 + 1 + 0.5 + 0.5 + 0.5 + 0 + 0 + 1 = 7.5$$

Retardation is expressed in the formula:

$$9 - 7.5 = 1.5$$

The above observations show, that mentally deficient children of various extent are more or less retarded in respect of mimic psycho-motility according to the data obtained by our method.

To complete the illustration we shall mention here a case when observing children of superior ability.

A boy of 6 years, 4 months, thin, pale. Asthenic constitution with a harmonic type of face, easily excited. Moderately active. He can read, write, count and draw. According to Binet he performs the tests 8, 9, and 10 years. Straight carriage. Expressive speech. Expressive lively mimics. Intellectually, supernormal. Testing

the mimic psycho-motility gave the following results.

SERIES	MOVEMENTS PERFORMED	PER CENT OF TESTS
<i>years</i>		
4-5	9	1.00
6	1	1.00
7	2	0.50
8	2	0.50
9	2	1.00
10-12	2	1.00
13-15	0	0.00
16	2	1.00
Total performance.....	20	

The mimic psycho-motility formula:

$$4 + 1 + 0.5 + 0.5 + 1 + 1 + 0 + 1 = 9$$

The advance in mimic psycho-motility is expressed in the formula.

$$5 - 9 = -4$$

Thus the tested child surpassed his standard by 4 grades.

Thus the data of mimic psycho-motility investigation are confirmed by observations of children not only of normal psycho-physical development selected for the ontogenetic analysis of mimic movements and the drawing of the standard metrical scale of active movements, but of subnormal-oligophrenical and supernormal types with a higher psycho-ability who clearly show a tendency of correlation between the general neuro-psychical development and the state of mimic psycho-motility.

As a result of our investigation we may make the following statements:

1. The number of active movements of facial musculature, i.e., mimic psycho-motility, infallibly increases with age.

2. The period of puberty is characterized by a slight decrease in number of the voluntary mimic movements, corresponding with somato-neurological dissociation peculiar to that period.

3. Most of the separate movements of the mimic musculature show a clear tendency to maturation at definite age periods; some movements mature earlier, others later. Some mimic movements do not display any noticeable evolutionary regularity.

4. The association systems of the cerebral cortex which continue to develop throughout childhood, puberty and adolescence, are the anatomical-physiological basis of mimic psycho-motility evolution.

5. The ontogenetic analysis of the evolutionary peculiarities of active

mimic movements permit us to construct a graded, according to age, scale of mimic psycho-motor tests serviceable for investigations of motor ability in pedagogical and neuro-clinical practice.

6. There is a definite positive correlation between the general psychic development and the voluntary mimic motility. The mimic psycho-motility of children of oligophrenical type is very poor and shows a retardation, according to our method, by several age groups. With children of normal development the number of active movements of the facial musculature corresponds with the age standard and the motility of superior children is rich and extensive and exceeds in number of movements the respective age standard.

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An Early Intelligence Test

FLORENCE L. GOODENOUGH

WRITERS on the history of mental testing have usually accredited Binet, in his 1908 scale, with the first attempt to develop an objective series of age-standards by means of which the mental development of individual children might be judged.

Galton's sensory tests described in *An inquiry into human faculty* (1883) were designed primarily for use with adults, as were also the early mental tests developed between 1889-1893 by Cattell, Münsterberg, Jastrow, and others. Age was accordingly not taken into account. Gilbert's tests of school children, the results of which were published in two articles (1894, 1897) were taken over directly from the methods described by Cattell. Although results for the ages six to nineteen years are presented for each test separately, there is no attempt to combine the data into separate age-groups.

Binet's scale covered the ages from three to thirteen years, and was intended chiefly for use with school children. Not until much later, with Kuhlmann's 1922 revision of the Binet tests were the age standards extended downward to cover the first three years of life.

A small number of tests for the earlier mental levels are given in Binet's 1905 scale,

but these were not well standardized and are not classified into age-groups. They were designed for use in the testing of older idiots rather than for use with infants.

It is not generally known that as early as 1887 a series of developmental standards constituting a rough age-scale for judging the mental development of infants during the first three years was worked out by Dr. Stanford E. Chaille, Professor of Physiology, Pathological Anatomy and Hygiene at Tulane University. Chaille's report (1) was published in a medical journal of limited circulation; a fact that probably explains why it has escaped the attention of psychologists up to the present time. Although Chaille does not specifically use either the term "mental age" or "mental test," both these ideas are implicit in his discussion and in the organization and presentation of his data.

The first use of the term "mental test" is usually accredited to Cattell in an article published in the *Psychological Review* in 1890. The term "mental age" did not come into use until the publication of Binet's 1908 scale; more than two decades after Chaille's article was published.

In the outset of his article Chaille points out the importance of correct estimation of the course that mental development is taking in the indi-

vidual child, and the difficulty of making such judgments in the absence of valid comparative data.

"Many . . . misled by love and vanity, attribute superior merit to their own offspring; some few, timid and inexperienced, are distressed by idle fears of deficiencies; so that, on the whole, few parents estimate aright the progress which the ordinary, average baby, especially if it is their first one, ought to make. Doctors and nurses have better knowledge, but even doctors, if as ignorant as myself, must have often deplored their inability to answer with sufficient accuracy the very natural questions, frequently propounded by parents, concerning the age at which this, that, and the other indication of progress should be developed. For this reason it is worth while to note, more fully than is recorded in any book which I have found, the progress which should be expected of the average baby . . . Teachers greatly need more accurate knowledge of the mental and moral faculties of the average child at different ages. To what extent are these various faculties developed, what peculiarities and what deficiencies characterize different ages?"

Chaille points out the need for a sound understanding of the facts of mental development as a basis for education and training, both for the parent and for the teacher. The practical significance of the abilities and inabilities noted at each age are stressed throughout the article.

He then proceeds in systematic fashion to outline a series of developmental standards for each month of age during the first year, thereafter for the ages 15, 18, 24, and 36 months. The idea of decreasing increments of development with advancing age, a point greatly stressed by Gesell some 38 years later (3 and 4), is evident from his choice of intervals as well as

from incidental comments scattered throughout the article.

The data for these standards appear to have been collated from the literature and supplemented by his own observations as a physician. It is noteworthy that many of the individual items correspond fairly closely to those found in the developmental schedules or mental tests for infants published during the past few years. Since the complete series is to be found in the article cited I shall not attempt to reproduce it here, but will merely quote a few representative items for each age.

"First four weeks. From birth, the reflex acts, sucking, crying, hiccupping, yawning, stretching, etc., are all well done. . . . During the first fortnight, susceptibility to sounds is usually observed, sudden sounds causing them to start and to blink. They take months to learn to appreciate the *direction* and the *distance* of sound."

"During even the first week, babies probably distinguish light from darkness but not until the second week will their eyes follow a candle. In fact nothing except a candle or a light will cause them to fix their eyes from usually about the tenth to the forty-fifty day."

"Babies usually smile after three weeks of age."

Kuhlmann (6) includes the response by starting or blinking to sudden sounds in his series of three-months' tests (his earliest level), Gesell places this reaction at one week. Linfert and Hierholzer (7) found that the socially stimulated smile occurred in 60 per cent of their cases by the age of one month. Mary Cover Jones (5), however, reports the median age as 58 days: Gesell (3 and 4) places it at three months. The wide variation in reporting these items is in the main

due to differences in definition and to manner of eliciting the response. It is evident that Chaille differs no more from the standards laid down by modern investigators than these investigators differ from each other.

"One month (30-60 days). Before the fortieth day, the hands are moved awkwardly but voluntarily to the mouth, but other movements of limbs and body continue to be vague, jerky, purposeless. . . . At thirty to forty days, luminous objects give manifest pleasure."

Kuhlmann includes the carrying of objects to the mouth in his series of three-months' tests. Gesell gives the hand-to-mouth reaction a C rating (i.e., passed by 85-100 per cent of all cases) at four months.

"Two months. Babies begin to acquire some idea of distance so that they less frequently scratch their faces without intending it. . . . At two and one-half months old, a bottle of water, instead of milk, may be refused with an expression of disgust."

Gesell notes "recognition responses" to mother or bottle at one to two months. Linfert and Hierholzer report facial expression of distaste to salt (more than mere crying) in 50 per cent of their cases at four months.

"Three months. The head can usually be held erect when a baby is three to three and a half months old. . . . Tears are usually shed the third or fourth month. . . . The hands are voluntarily lifted to the face much oftener; they are stretched out also to near objects, and the arms are held out to the mother. . . . When three and a half months old, a baby may be amused by the play of covering and uncovering his face."

Gesell also gives three months as the age for holding the head erect and

steady. Linfert and Hierholzer found 46 per cent of their four months old cases were able to do so. Gesell reports tears at one week. Elsewhere in his article, Chaille comments on the great variability in the age at which tears first appear.

"I have trustworthy evidence of one baby who shed its first tear before it was fourteen days old, and I have now under observation a baby who shed its first tear, a solitary one and out of one eye only, on the ninety-eighth day; yet this infant has never lacked the usual baby accomplishment of crying often and vociferously."

Gesell likewise includes a number of reaching tests in his series. Closing in on a dangling ring is assigned to the four-months' level. Fenton (2) describes the game of "peek-a-boo" mentioned above as having been a great favorite of her child during the sixth month.

"Four months. A baby can sit upright and can execute a few special actions with his hands although he may still often fail to seize objects brought close to him. The use of hands and arms is developed much sooner than is the use of the feet and legs. . . . They look intently at their own hands or other objects near to them. . . . At four and a half months a baby may smile at an image in a mirror."

Sitting alone is not usually reported before the sixth month, but sitting with slight support occurs earlier. Gesell includes the inspection of his own hand in play in his four months series, but he places the reaction to a mirror image at seven months. Chaille's comment on the precocious development of the use of the arms and hands is of special interest in the light of recent emphasis upon the law of anterior-posterior development.

"Five months. A baby may attempt to move in time with music when five months old, and he may associate his own name with himself and his eyes may seek his nurse if her name be called. Further evidence of the dawn of ideas and associated ideas may be manifested by a baby's anger if not taken out of doors as soon as its cloak and hat have been put on."

"Six months. At this age a baby sits up; arms, hands and fingers can accomplish many delicate movements and playthings are enjoyed. . . . Babies respond with jumps and other evidences of gratification to attempts to amuse them; they will stroke the mother's face and babble inarticulate sounds of admiration. . . . In first efforts at speaking there is always a marked preference for *a* and other vowels."

"Seven months. Usually at the seventh and eighth month they begin to crawl on the floor. . . . A baby may be able to shake its head when told to do so. . . . By the seventh month babies usually begin to mumble *m, m, m,* and *p, p, p,* which soon become *mama* and *papa.*"

Most of the recent investigators place these abilities at a later age.

"Eight months. At this age the infant usually begins to imitate sounds, and may articulate several syllables. Speech is at first always of monosyllables and these reduplicated, dyssyllables come slowly, at about the twentieth month, and polysyllables still more slowly."

Gesell puts the beginning of imitation of sounds at the tenth month.

"Nine months. By the ninth or tenth month babies usually begin to rise on their feet by clinging to some object, and to learn to walk. They associate their own names with their image in a mirror and begin to look behind to discover the cause of a shadow."

Gesell puts the ability to pull to a standing position at ten months, Shirley's (8) median age was 47 weeks.

"Ten months. At this age a child may be taught to understand that it is naughty to cry in order to get what is wanted. . . . Usually only two or three words can be spoken."

"Eleven months. Many actions may be imitated, and the child may have been taught to be afraid of fire. . . . Gestures, intonations of voice, numerous words and even a few short phrases may be understood, although only a few syllables can be spoken."

Gesell notes that at twelve months, the child will adjust to simple verbal commissions, and will inhibit simple acts on command.

"Twelve months. Although infants still prefer, at this age, the rôle of quadruped, yet most of them can toddle a few steps by themselves, and before the second year can not only stand but begin to run alone. . . . When one year old, infants may imitate the voices of dogs, cats, pigs, donkeys, etc., and may have advanced sufficiently as linguists to put two words together."

"Fifteen months. Great progress has been made in motor activity; the hand has become trained to touch with considerable discrimination; a spoon or a glass can be carried to the mouth. . . . The frowns, irritable ways and angry voice of a parent may be imitated by a child when only fifteen months old, and be transmitted thus early from father to son."

Gesell also puts the use of a spoon at fifteen months.

"Eighteen months to two years old. "At this age the difference between *one, two,* and *several* is appreciated; at two and a half years old a child may count to twelve, but ordinarily even at three years of age, they cannot count and appreciate more than *four* or *five* and it takes them from the sixth to the seventh year to get up to one hundred."

Counting two blocks is graded as a two-and-a-half year test in the

Merrill-Palmer series (9); counting four pennies is placed at age four by Terman (10), and at age five by Kuhlmann (6).

The standards for two and three years as given by Chaille have to do largely with personal-social qualities and with suggestions for training. Like those reported for the earlier ages they tend to suggest a somewhat higher standard of development, age for age, than is reported by most of the modern investigators. The difference may be due either to more lenient standards or to the fact that most of the reports of infant development published up to that time were based upon children of superior parentage. There is reason to suppose that the children whom Chaille himself had opportunity to observe were likewise from the more intelligent social classes.

The article also includes a number of tables showing age-changes in height, weight and chest circumference, eye color and hair color. Dates for the eruption of the temporary teeth are also given, as well as notes on a number of other items of physical development.

DISCUSSION

The article described here is believed to be the earliest published example of an attempt to compile a series of normative standards based upon the *age at which various abilities develop in the average child* for use in estimating the mental level of individuals. Like many other scientific discoveries that were made somewhat in advance of their time, it attracted so little attention that when, more

than twenty years later, the same idea occurred to Binet who incorporated it into his 1908 scale, the previous work of Chaille had been completely forgotten (if, indeed, it had ever been called to the attention of psychologists or others interested in the subject) and Binet was accordingly given entire credit for the concept. Simple and obvious as the device may seem, it was nevertheless destined to revolutionize the entire theory and practice of mental testing. Its importance is well summed up by Terman (10) who comments upon it as follows:

"Why should a device so simple have waited so long for a discoverer? We do not know. It is of a class with many other unaccountable mysteries in the development of scientific method. Apparently the idea of an age-grade method, as this is called, did not come to Binet himself until he had experimented with intelligence tests for some fifteen years. At least his first provisional scale, published in 1905, was not made up according to the age-grade plan. It consisted merely of 30 tests, arranged roughly in order of difficulty. Although Binet nowhere gives any account of the steps by which this crude and ungraded scale was transformed into the relatively complete age-grade scale of 1908, we can infer that the original and ingenious idea of utilizing age norms was suggested by the data collected with the 1905 scale. However the discovery was made, it ranks, perhaps, from the practical point of view, as the most important in all the history of psychology."

BIOGRAPHICAL NOTE

Dr. Stanford Emerson Chaille, son of William Hamilton Chaille and Mary Eunice Stanford was born at Natchez, Miss., July 9, 1830. He received the A.B. degree from Harvard in 1851, studied medicine at Tulane from 1851-1853, then returned to Harvard where he received the M.A. degree in 1854.

He studied physiology under Claude Bernard in Paris for three years. At the outbreak of the Civil War he returned to America and served as surgeon and medical inspector for the C.S.A. Army of Tennessee from 1862-1865. At the close of the war he became a member of the Faculty of Medicine at Tulane, where he held successfully the rank of demonstrator of anatomy, professor of physiology, pathological anatomy and hygiene, dean of the medical school, professor emeritus until his death in 1911.

Chaille is the author of many scientific articles, the greater number of which were published in the *New Orleans Medical and Surgical Journal* of which for many years he was co-editor. His interest in the functional aspects of child development was probably stimulated in connection with the popular lectures which he was accustomed to deliver to parents and teachers.

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A Study of the Attitudes of Teachers Toward Behavior Problems

WINIFRED E. BAIN

HOW serious is it for a school child to smoke? Is day dreaming more serious than whispering in school? Is it worse for Mary to be profane than for John to explode with an oath? Beliefs concerning the seriousness of misbehavior of children are dependent upon social standards of conduct. The activities of individuals become problematic if they conflict with the ideals held by others for desirable behavior. Such ideals assume significance since standards held for conduct influence measures which are taken for prevention and correction of difficulties.

Much concern has been apparent in the past decade over what may be deemed normal child behavior. Research and clinical experience have tended to shift opinions with regard to the effect of certain childish tendencies upon normal functioning in adult life. It is probable that fuller understanding of the nature and needs of childhood and of trends in social thought have influenced the attitudes held about what is natural behavior and which deviations from social standards are more serious in their consequences.

This study deals with the attitudes of six groups of teachers toward the seriousness of common behavior prob-

lems in children as measured by ratings on a scale devised by E. K. Wickman (2) and reported in *Children's Behavior and Teachers' Attitudes*.¹ The teachers who made the ratings were enrolled in certain classes in Teachers College, Columbia University. Three of the groups made ratings in 1927. Three corresponding classes rated the scale in 1932—five years later. This made possible an analysis of teachers' attitudes toward behavior problems at intervals five years apart in a decade rife with concern about child development and welfare.

PURPOSE AND CHARACTER OF THE FIRST STUDY

The study made in 1927 was carried on for three purposes. The first was to afford an analysis of the character of the attitudes held by various groups in Teachers College pursuing work in different fields; the second purpose was to discover what differences might be held in attitudes toward behavior difficulties when occurring in boys and the same when occurring in girls.

¹This study was begun through the courtesy of E. K. Wickman before the publication of *Children's Behavior and Teachers' Attitudes*, and carried on with the coöperation of the Child Development Institute, Teachers College, Columbia University.

Further, it was thought that the effect of teaching in the various courses might be measured if attitudes were recorded at the beginning of a semester of work, and again at the end.

For these purposes three classes were selected to cooperate in the study. Classes I and II were pursuing courses dealing directly with the development and behavior of children. Class III was concerned with the training of teachers, and therefore dealt only in an indirect way with the nature and needs of childhood, as such study is needed in order to determine the nature of practical educational work. Class I was enrolled in a course named "Mental Development of the Preschool Child." About this course the catalog said in part: "This course will undertake to trace mental development from birth to five years of age . . . the attempt will be made to relate mental growth to physical development and to the social aspect of child life. Special stress will be put on the consideration of the emotional life of young childhood and of theories of behavior." Class II was made up of people taking a course called "Field Work in Education of Parents." Excerpts from the catalog description follow: "This course includes observation and discussion of activities of groups of parents . . . there will be conferences with the instructor and others based upon observation of the work of such groups leading to an appraisal of materials and methods of work with parents and others interested in children." Class III was engaged in studying the problems of a training school for teachers in a Normal or Teachers College. The

description of this course includes the following significant statements: "This course is intended for directors of training schools, critic teachers, or supervising teachers in training schools, demonstration, and other laboratory schools. It considers directly the work and problems of inducting intending teachers into their profession." The list of topics following this statement included mention of manifold duties of teachers preparing for such work, but no specific mention of the teachers' study of children.

Purpose and character of the second study

The second study which was undertaken in 1932 was made primarily to ascertain whether the attitudes of corresponding groups working in Teachers College were similar to or different from those held by the students measured five years previously. Each of the six groups was asked to rate on the Wickman scale the degree of seriousness which they attached to various behavior problems of children at the beginning of a semester of study, and again at the end. Comparisons were then made between attitudes held before and after the teaching period; also between attitudes held in 1927 and those held in 1932 as indicated on the scale.

The personnel of the six classes was rather typical of Teachers College groups. They were all graduate students with the exception of a small percentage of people having completed two years of college work and two or more years of successful teaching. Practically all had had some experience in educational work. This experience

represented a wide range of types,—from nursery school through college—with a representation of special interests in various fields, such as home economics, psychology, and the like. A small percentage were special workers in such fields as religious education, nursing, parent education, and psychiatric social work.

The curriculum of Teachers College in 1932 was somewhat changed from that in operation in 1927. However, groups were selected for the repetition of the earlier study which were as nearly comparable as possible to those which made the first rating. In the catalog of 1932 Class I was entitled "Mental and Social Development of the Young Child." Its description corresponded closely with that of the corresponding class in 1927: "This course will consider development from mental, social, and emotional aspects; physical and educational development will be presented as factors in mental and social growth." To make up a group comparable to that of Class II in the former study two classes were combined; Class A was called "Child Development and Parent Education." The catalog states the purposes of this course as follows: "(1) to orient the student in the field of child development and of parent education, (2) to study the development of children from the prenatal period through adolescence from a point of view which will integrate the physical, nutritional, mental, social, and emotional aspects, (3) to study the historical and social background of the family of today, and the influence of family life and parent-child relationships on child development, (4) to provide experience

with children and their parents in order to integrate theoretical information with actual problems." Class B, an "Advanced Course in Parent Education" was described as follows: "This course is offered for advanced students in Parent Education. The work will be based upon individual projects, and specific programs connected with the field of work. Actual problems in organization, administration, and leadership of Parent Education programs will be used as basic material for class discussion and study." Class III, although covering similar material as that in the course offered as Training School Problems in 1927, was in 1932 organized in two groups: Group A, "Training School Problems," was described in the catalog identically as quoted in relation to this course in the former study. Group B, a course called "Organization and Supervision of Student Teaching," covered a list of topics similar to those considered by Group A, but carried the following description of organization of work: "Students register for their entire time in this course for the equivalent of two semesters. In addition, a period of practice is required. . . . The work preparing specifically for critic teaching in normal schools and Teachers Colleges will occupy approximately one-half of the students' time. The other half will be divided about equally between: (1) supplementary professional work in subject matter fields in which the critic teacher intends either to teach or to supervise . . . and (2) general professional and general background work." The combination of these various groups was estimated by those

in charge of the courses to constitute comparable classes to the three which had been studied five years previously. Throughout this account, the groups will be designated in each study as Class I—Child Development; Class II—Parent Education; Class III—Training School Problems.

The rating scale

Each person participating in the study was asked to rate fifty behavior problems of children on the Wickman Scale (2). The fifty problems were listed, and at the right of each a scale line was drawn on which ratings were placed indicating the seriousness of the problem in the estimation of the rater, thus:

How serious (or undesirable) is this behavior in *any* child?

	Of no consequence	Of only slight consequence	Makes for considerable difficulty	An extremely grave problem
Tardiness...				
Truancy....				

Explicit directions accompanied the scale instructing the rater to rate each item, answering the question "How serious is it for the individual child who shows this behavior? In other words, how much does it make him a problem child, disturbing or a misfit? This amounts to the same thing as asking, How undesirable is this behavior in the school child?" The raters were further asked to work as rapidly as possible in an effort to get their first reaction, and to consult no one in answering the questionnaire (2).

The ratings thus recorded were

scored by a calibrated rule containing 20 equal divisions, to each of which scores from one to twenty were assigned (2). Means and probable errors were computed for each item on the scale as rated by each of the groups in the two studies. These averages have been used in the analysis which follows.

Comparison of ratings on boys and girls

Note has previously been made of the fact that each class made two ratings on this scale; one at the beginning of a semester of study; the other at the end. In the first study ratings were made separately on the seriousness of the various items of behavior when they occurred in girls, and the same when they occurred in boys. The correlations between the ratings on seriousness of the various acts of behavior in boys and the same when occurring in girls ranged from $.91 \pm .02$ to $.95 \pm .01$. (See table 1.) These correlations and all others used throughout this report were computed by the method of rank differences and converted into corresponding r values. Since for the most part it was found that in the opinion of the raters behavior serious for one sex was serious also for another, separate ratings for boys and girls were not made in the second study.

RESULTS OF FIRST STUDY

What were serious problems in children according to the opinion of the teachers making the ratings in 1927? In general, problems relating to sexual immorality and dishonesty were assigned the place of greatest seriousness by all groups. These included untruthfulness, cheating, steal-

ing, masturbation, heterosexual activities, and obscene notes. In contrast those problems relating to difficulties which disturb a teacher in the conduct of school work were rated as least serious by all groups. These included whispering, interrupting, inquisitiveness, restlessness, silliness, thoughtlessness, and inattention. With fair consistency the ratings in the mid-portion of the scale were shared by problems relating to difficulties with authority, such as, disobedience, impertinence, and temper tantrums; problems of social antagonism including resent-

of sex, stealing, and dishonesty were considered most serious. Those of withdrawing, recessive personality traits were rated as least serious, while between the two extremes were located problems of application to school work and those of antagonistic, aggressive personality traits, with somewhat less seriousness attached to the last group.

The tendency of the Teachers College groups to view with little concern the age old disturbances of school routine appeared to indicate at the outset the influences of modern educational methods which encourage greater

TABLE 1
Correlations between ratings on seriousness of behavior in boys and in girls
First study

	FIRST RATING	SECOND RATING
	<i>r</i>	<i>r</i>
Class 1—Child Development.....	.93 ± .02	.95 ± .01
Class 2—Parent Education.....	.92 ± .02	.93 ± .02
Class 3—Training School Problems.....	.94 ± .01	.91 ± .02

fulness, sullenness, domineering, and stubbornness; and problems describing withdrawing, recessive personality traits, such as, shyness, sensitiveness, fearfulness, unsocial withdrawing, dreaminess, and physical cowardice. In this middle group there was a tendency to assign relatively less seriousness to the last mentioned tendencies of withdrawal.

This general direction of the teachers' weighting of the fifty behavior problems was somewhat different from that maintained by teachers reported by Wickman in the experimental groups which he studied during the same year. In the Wickman study, as in the one here reported, problems

freedom for social communication and expression in the classroom.

After a semester of work in the various courses when ratings were again made, certain consistent trends toward changes of attitude in relation to different types of problems were apparent in Classes I and II pursuing courses in Child Development and Parent Education. Class III, studying Training School Problems, made little change. Table 10 shows correlations between first and second ratings ranging from .86 ± .03 to .89 ± .03 for the first two classes, and .92 ± .02 to .93 ± .02 for the third class. These comparisons appear to indicate that there was less change in the group

which made no specific study of children than in the two groups which did. Comparisons were further made of the rank accorded specific problems in the opinion of the teachers at the beginning of their courses and those held at the end. In Classes I and II problems of unsocial, introverted, and recessive types were ranked relatively more serious on second rating by five or more points in order of arrangement in several cases. Such problems as dreaminess, shyness, fearfulness, unsocial withdrawing, sullenness, and unhappiness were shown to have relatively greater import in the minds of the members of the Child Development and Parent Education classes after their period of instruction than they had at the beginning of the semester. The same method of comparing differences in rank order showed in these classes a tendency to assign less seriousness to problems relating to sex, such as heterosexual activity, masturbation, and obscene notes, and to one or two offenses against social tradition, such as, tardiness and smoking. Such changes in attitude were not apparent in the comparison of first and second ratings by the class in Training School Problems, for which close agreement of opinions has already been noted in a high correlation.

Our speculation is that the changes which took place in the order of arrangement resulted from a revision of standards of conduct by those who made the ratings, and that these new standards were derived from a clearer understanding of the tendencies in children which make for good or ill in social life. The increased importance placed upon the behavior of the shy

retiring child leads to the inference that these teachers had come to base their evaluations more on the welfare of children and less on their own comfort and traditions. The child who habitually resorts to dreaming of unrealized success and quiet retreat from combat is not usually disturbing in school. He has often been known for this reason to be a favorite with the teacher, and from her in this way he has gained recognition which he has not earned through active achievement. Such tendencies, though inoffensive in a teacher dominated school, make for the development of ineffective and often pathological individuals in society. The changes in rating appeared to show recognition of these facts. On the other hand, it is probable that the raters had come to look more objectively and less emotionally on the problems of sex and other traditional forms of active misconduct. On their first rating many of the teachers were so shocked by the mention of sex difficulties that they extended the scale line across the margin of the paper and placed their ratings at the extreme end or drew arrows to show that their estimate of the seriousness of such misconduct could not be measured on the scale. It appeared, therefore, that the changes in ratings at the end of the semester indicated a tendency to base standards of conduct on objective consideration of the good of the child rather than on convenience, tradition or emotional abhorrence. A conclusion that attitudes were changed by teaching in specific courses could not be accurately supported in view of the set up of the study, but such an

inference might be drawn from the fact that a greater tendency toward change appeared in the two classes which had specific instruction with regard to the nature and behavior of children than in the one which considered methods of training teachers without direct attack on the basic study of children.

The changes in attitudes in Classes I and II appear to be in the same general direction of the thinking of Mental Hygienists of the times. In table 2

III maintained a fairly even correlation of $.15 \pm .10$ and $.17 \pm .10$ on first rating, and $.21 \pm .09$ and $.20 \pm .09$ on second rating.

It must be remembered that the changes apparent in attitude of the classes after they had completed courses dealing with the development and behavior of children indicate only a general tendency toward a change in thinking; yet this trend in the direction of greater consideration for the importance of negative types of social

TABLE 2
Correlations between ratings by mental hygienists (2) and by various classes
First study

	FIRST RATING		SECOND RATING	
	Boys	Girls	Boys	Girls
Class 1—Child Development.....	.18 \pm .10	.24 \pm .09	.47 \pm .07	.43 \pm .08
Class 2—Parent Education.....	.53 \pm .07	.54 \pm .08	.71 \pm .05	.68 \pm .05
Class 3—Training School Problems.....	.15 \pm .10	.17 \pm .10	.20 \pm .09	.21 \pm .09

Second study

	FIRST RATING	SECOND RATING
Class 1—Child Development.....	.64 \pm .06	.66 \pm .06
Class 2—Parent Education.....	.84 \pm .03	.79 \pm .04
Class 3—Training School Problems.....	.51 \pm .07	.47 \pm .08

is reported the correlation between the ratings of the three classes in this study with those made by a group of thirty Mental Hygienists and reported in the Wickman study (2). It will be seen that the class in Child Development raised its correlations with the Mental Hygienists from $.18 \pm .10$ for boys and $.24 \pm .09$ for girls on first rating to $.47 \pm .07$ and $.43 \pm .08$ on second rating. The class in Parent Education correlated $.53 \pm .07$ and $.54 \pm .08$ on first rating, and $.71 \pm .05$ and $.68 \pm .05$ on second rating. Class

reaction was sufficient to inspire a repetition of the measurement of teachers' attitudes five years later.

RESULTS OF SECOND STUDY

What were considered serious problems by the teachers in the second study? The opinions of the raters in 1932 agreed more closely with the attitudes of the Mental Hygienists in the Wickman study at the beginning of the semester than did those of the classes in 1927 at the end of their courses. Table 2 shows the correla-

tion of the ratings of each class with those of the Mental Hygienists. In almost every instance these correlations were considerably higher at the beginning of the second study than any obtained by similar comparison in the first study. The class in Parent Education had the highest correlations with the Mental Hygienists and the class in Training School Problems the lowest in both studies.

The trend of attitudes shown in the more recent ratings which made apparent the better agreement with the clinicians, may be inferred from an examination of table 3. In this table are listed the items which were deemed of greater or less seriousness in the second study on comparison with the first. This list was derived by comparing the first and second ratings of each class in the second study with ranks assigned by the corresponding classes. Since in the first study separate ratings were made on boys and girls, 18 comparisons were possible. Arbitrarily those items which were noted to have a difference of five or more points in rank order in six or more comparisons were isolated for special consideration. The difficulties which were consistently accorded a position of greater seriousness in the recent survey had to do with negative reactions to social life. Almost without exception they described the recessive, withdrawing type of behavior, such as discouragement, fearfulness, sensitiveness, unsocial withdrawing, and the like. Of the list resentfulness alone characterized reactionary behavior. Those items which were consistently accorded places of less seriousness in the second study were all

active offenses. They included sex problems of masturbation, obscene notes, pictures, talks, etc. With these also were certain problems relating to difficulties with authority, such as impertinence and impudence. According to these groups of modern teachers, it appears no longer to be a major offense for children to be truant from school; certain of the former ratings gave truancy a rank of greater seriousness than anything else on the list. Disobedience also was not thought to be as great an offense as it was supposed five years ago. Smoking, which in the past violated the sensitivities of the teacher, was in this instance eased to a place of relatively minor significance. Even a child's outburst of profanity seemed not to be so bad in 1932 as it was in 1927. On inspection of this list one queries also if the old fashioned virtue of honesty is considered less essential when one observes that on six comparisons the problem of untruthfulness was lowered in the list made in 1932 by thirteen to twenty-six points.

It may be inferred that the raters in 1932 had been influenced not alone by an insight into the harmful effects of recessive withdrawing from reality, which was formerly encouraged in the traditional school, but also by shifts in social standards which place less restriction upon outward offenses which were formerly held in check by tradition. Smoking among teachers and parents is probably more common than it was five years ago. There is without doubt a new outlook on religion which may have affected the attitude toward profanity. Respect for authority of man as well as the

TABLE 3

Comparison of first and second studies on ranking of seriousness of problems by various classes¹

MORE SERIOUS IN SECOND STUDY	POINTS OF DIFFERENCE IN RANK ORDER	LESS SERIOUS IN SECOND STUDY	POINTS OF DIFFERENCE IN RANK ORDER
Easily discouraged.....	5, 6.5, 12.5, 17.5, 8, 5, 13, 6	Impertinence.....	9.5, 8, 8, 19, 18, 10, 18
Fearfulness.....	17, 13, 7, 11, 13, 8, 13, 10, 10, 6	Impudence.....	11, 12, 7.5, 8, 5, 14
Lack of interest.....	13, 18, 18, 24.5, 11, 13, 17, 15, 22, 17.5	Masturbation.....	14, 12, 23.5, 20, 12, 18, 6, 7
Nervousness.....	10.5, 12.5, 7.5, 8, 10, 13, 9, 18, 12.5, 12, 7	Obscene Notes.....	5, 6, 7, 22, 16, 7
Sensitiveness.....	13.5, 10.5, 14, 15, 31, 21.5, 11.5, 9, 7, 12, 9	Slovenliness.....	11.5, 5, 8, 7, 11.5, 6, 6
Suggestible.....	6.5, 7, 12, 6, 6, 6	Smoking.....	29, 29, 21.5, 18, 12, 17, 20
Unhappy, depressed.....	10.5, 17.5, 10, 7, 13.5, 16.5, 17	Truancy.....	5, 11, 16, 7, 7, 14, 9, 6
Unsocial withdrawing.....	22, 22, 18, 12, 12, 10, 17, 8.5, 15, 9	Untruthfulness.....	12, 17, 26, 26, 24, 21
Resentfulness ²	7, 7, 7, 16, 7	Profanity.....	23, 25.5, 15, 12.5, 16, 24, 15, 5, 16, 15, 18, 16
Physical cowardice ²	13, 13.5, 11.5, 5, 11, 12, 14	Destroying materials.....	17, 11, 15, 22, 11, 7
Shyness ²	14.5, 20.5, 16, 21, 12, 6, 7, 7	Disobedience ²	7, 11.5, 10, 12, 11, 13.5, 12, 8, 6.5
Enuresis ²	5, 7, 7, 11, 12.5	Temper tantrums ²	11.5, 13, 9, 10, 9, 10
Unreliable ²	9, 6, 5, 7	Quarrelsomeness ²	7, 7.5, 6.5, 5

¹ Comparisons were made between rankings assigned in the first and second studies by corresponding classes. Ranks for seriousness on first ratings were compared with first ratings and on second ratings with second ratings in each instance. In this table are problems where a difference of five points or more in rank was apparent in six or more comparisons. All such comparisons showed consistently higher or lower ranking except those indicated. (See note 2.)

² One comparison indicated ranking inconsistent (either higher or lower) with those shown in table.

³ Two comparisons indicated ranking inconsistent (either higher or lower) with those shown in table.

⁴ "Laziness" alone showed decided inconsistency. It ranked more serious in four comparisons and less serious in four comparisons.

Diety has been put upon new bases. Traditions have been overhauled. If credence may be placed upon this interpretation, it gives some occasion for caution, lest our newer standards lose sight of social integrity.

One peculiarity of the recent rating of teachers is apparent on consideration of the probable errors of the averages. These were tremendously high. For the most part they fell in the range between 3.5 and 5.0, although some were lower and some few were as high as 9.0. The variability in these ratings was far greater than that obtained in the first study where probable errors clustered around 2.5 and 3.0 with only a few as high as 4.0. Wichman's experimental groups rated with less spread than did the raters in either of the studies made at Teachers College. Some disagreement in opinions might be expected from the fact that the types of conduct listed on the scale were not defined and might conceivably mean one thing to one individual and something different to another. Again chance for variation in opinion might be afforded by the range of children's age levels which users of the scale were asked to consider. Certain types of behavior might be thought to be normal for children of one age and unwholesome for those older or younger. However, the spread of ratings increased to such an extent in the later survey as to present an interesting condition of affairs. The greater scatter of ratings appears to indicate that although the means may be taken to show a general direction of thinking, this trend is not a sweeping one. It may be a condition which accompanies a shift in social

values. It is probable also that the students in 1932 were beginning to realize that there is need for a more complete picture than the Wickman scale gives of an individual child's behavior before the seriousness of that conduct can be determined. Although it has been customary to think of behavior problems as separate entities, recent findings have emphasized that the relationship of one type of behavior to another must be considered, rather than any one offense by itself, in determining the seriousness of conduct. Because of the wide scatter in ratings on any given items many of the differences in averages are more apparent than real. Tables 4 to 9 list items which were rated reliably more or less serious by the classes in the second study. These show a complete agreement with the tendency reported in the first study to consider least serious those offenses which interrupt the even tenor of traditional school routine. Among the most serious problems are still to be found heterosexual activity from among the list of sex difficulties which formerly occupied a position of extreme importance; and cheating, stealing and cruelty, or bullying, from among the list of offenses against social integrity. Other items which make up the list of problems of greatest weight for the most part, are those which describe behavior of the fearful, insecure, and unhappy individual.

After a semester of study the classes in 1932 changed their attitude but little. The correlations between first and second ratings made by these groups may be seen in table 10 to be very high, much higher than those

TABLE 4

Problems rated reliably more or less serious by class 1, child development, first rating (second study)

	More Serious Than		More Serious Than
Easily discouraged	Whispering ¹	Untruthfulness ²	Profanity
Truancy	Interrupting	Temper tantrums	Tardiness
Suggestible	Imaginative lying	Stealing	Disorderliness
Obscene notes	Inquisitiveness	Unhappy, depressed	Slovenliness
Unsocial withdrawing	Restlessness	Heterosexual activity	Smoking
Fearfulness	Thoughtlessness	Cheating	Tattling
Cheating	Silliness	Nervousness	Dreaminess
Nervousness	Profanity		Stubbornness
Cruelty	Tardiness		Overcriticalness
Untruthfulness	Disorderliness		
Temper tantrums			
Stealing			
Unhappy, depressed			
Heterosexual activity			

¹ Rated as least serious of all items.

² Rated as most serious of all items.

TABLE 5

Problems rated reliably more or less serious by class 1, child development, second rating (second study)

	More Serious Than		More Serious Than
Easily discouraged	Whispering ¹	Nervousness ²	Profanity
Lack of interest	Interrupting	Fearfulness	Tardiness
Temper tantrums	Imaginative lying	Unreliableness	Disorderliness
Enuresis	Inquisitiveness	Cheating	Slovenliness
Truancy	Silliness	Cruelty, bullying	Smoking
Obscene notes	Restlessness	Unhappy, depressed	Tattling
Unsocial withdrawing	Thoughtlessness	Stealing	Impudence
Suggestible	Tattling	Heterosexual activity	Inattention
Nervousness	Slovenliness		
Fearfulness			
Unreliableness			
Cheating			
Cruelty, bullying			
Unhappy, depressed			
Stealing			
Heterosexual activity			

¹ Rated as least serious of all items.

² Rated as most serious of all items.

TABLE 6

Problems rated reliably more or less serious by class II, parent education, first rating (second study)

	More Serious Than		More Serious Than
Physical cowardice	Whispering ¹	Easily discouraged ²	Smoking
Domineering	Interrupting	Unreliableness	Thoughtlessness
Sensitiveness	Profanity	Heterosexual activity	Silliness
Enuresis	Imaginative lying	Cruelty, bullying	Slovenliness
Resentfulness	Disorderliness	Nervousness	Impudence
Unsocial withdrawing	Inquisitiveness	Fearfulness	Inattention
Suggestible	Tardiness	Unhappy, depressed	Disobedience
Easily discouraged	Restlessness		
Unreliableness	Smoking		
Heterosexual activity	Thoughtlessness		
Cruelty, bullying			
Nervousness			
Fearfulness			
Unhappy, depressed			

¹ Rated as least serious of all items.

² Rated as most serious of all items.

TABLE 7

Problems rated reliably more or less serious by class II, parent education, second rating (second study)

	More Serious Than		More Serious Than
Stealing	Whispering ¹	Easily discouraged ²	Stubbornness
Cheating	Interrupting	Suggestible	Tardiness
Resentfulness	Imaginative lying	Unsocial withdrawing	Smoking
Unreliableness	Inquisitiveness	Cruelty, bullying	Slovenliness
Easily discouraged	Disorderliness	Unhappy, depressed	Thoughtlessness
Suggestible	Profanity	Heterosexual activity	Impertinence
Unsocial withdrawing	Restlessness	Fearfulness	
Cruelty	Disobedience	Nervousness	
Unhappy, depressed	Tardiness		
Heterosexual activity	Stubbornness		
Fearfulness			
Nervousness			

¹ Rated least serious of all items.

² Rated most serious of all items.

TABLE 8

Problems rated reliably more or less serious by class III, training school problems, first rating (second study)

More Serious Than			More Serious Than
Temper tantrums	Whispering ¹	Nervousness ²	Slovenliness
Selfishness	Interrupting	Unhappy, depressed	Tardiness
Cruelty, bullying	Imaginative lying	Unreliableness	Disorderliness
Destroying materials	Inquisitiveness	Cheating	Shyness
Nervousness	Restlessness	Masturbation	Dreaminess
Unhappy, depressed	Silliness	Obscene notes	Tattling
Unreliableness		Untruthfulness	Thoughtlessness
Cheating		Stealing	Sensitiveness
Masturbation		Heterosexual activity	Inattention
Obscene notes			
Untruthfulness			
Stealing			
Heterosexual activity			

¹ Rated least serious of all items.

² Rated most serious of all items.

TABLE 9

Problems rated reliably more or less serious by class III, training school problems, second rating (second study)

More Serious Than			More Serious Than
Nervousness	Whispering ¹	Unreliableness ²	Tardiness
Unhappy, depressed	Imaginative lying	Obscene notes	Thoughtlessness
Cruelty, bullying	Restlessness	Untruthfulness	Disorderliness
Destroying materials	Interrupting	Cheating	Shyness
Masturbation	Inquisitiveness	Heterosexual activity	Stubbornness
Suggestible	Silliness	Stealing	
Unreliableness			
Obscene notes			
Untruthfulness			
Cheating			
Heterosexual activity			
Stealing			

¹ Rated as least serious of all items.

² Rated as most serious of all items.

TABLE 10

Correlations between ratings made at beginning and end of college courses by each class

	FIRST STUDY		SECOND STUDY
	For boys	For girls	
	<i>r</i>	<i>r</i>	<i>r</i>
Class 1—Child Development.....	.88 ± .03	.89 ± .03	.95 ± .01
Class 2—Parent Education.....	.86 ± .03	.87 ± .03	.96 ± .01
Class 3—Training School Problems.....	.92 ± .02	.93 ± .02	.96 ± .01

TABLE 11

Comparison of first and second ratings by class I, second study, on seriousness of problems

MORE SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER	LESS SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER
Dreaminess.....	5	Impudence.....	5
Impertinence.....	8	Shyness.....	5.5
Sullenness.....	10	Laziness.....	5
Unreliableness.....	17	Untruthfulness.....	14
Enuresis.....	6	Temper tantrums.....	10
		Masturbation.....	11

TABLE 12

Comparison of first and second ratings by class II, second study, on seriousness of problems

MORE SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER	LESS SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER
Silliness.....	5	Disobedience.....	7
Inattention.....	6.5	Dreaminess.....	6
Selfishness.....	5	Stubbornness.....	7
Truancy.....	6	Shyness.....	8
Destroying materials.....	8	Suspiciousness.....	6
Obscene notes.....	8	Sensitiveness.....	8.5

TABLE 13

Comparison of first and second ratings by class III, second study on seriousness of problems

MORE SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER	LESS SERIOUS ON SECOND RATING	POINTS OF DIFFERENCE IN RANK ORDER
Suggestible.....	7	Smoking.....	6
Tattling.....	7	Physical cowardice.....	6
Sensitiveness.....	8	Thoughtlessness.....	5
Suspiciousness.....	8	Stubbornness.....	8
Slovenliness.....	6	Sullenness.....	5
Impertinence.....	15	Impudence.....	10

recorded for similar comparisons on Classes I and II in the first study. Relatively few of the items on the scale were changed in rank order by five points or more in any class. Those items which showed a difference of this magnitude are listed in tables 11, 12 and 13. It is probable that a different type of instrument is needed in order to measure the changes brought about in thinking by the courses offered in 1932, since from the outset the teachers in all classes showed a different point of view than that indicated by the survey made five years previously.

SUMMARY AND INTERPRETATION

It must be remembered that while many comparisons noted in these studies are statistically reliable, many others are of interest because of the frequency with which they indicate trends shown in ranking certain types of behavior relatively more or less serious than others on repeated measurement of the attitudes held by the same or comparable groups of teachers. Allowing this latitude in analysis there appeared to be a general belief in the equality of conduct acceptance in boys and in girls. Changes in thought at the end of a period of teaching in the first study were in the general direction of greater agreement with Mental Hygienists with whose ratings comparisons were made. This fact forecasts the condition of thinking which appeared five years later in a repetition of the study, when comparable groups of teachers approximated the ratings of the Mental Hygienists more closely than did earlier classes with which they were compared. In view of the purport of these changes it was per-

haps not surprising that a wide scatter of opinion existed among the modern teachers whose attitudes were studied.

Fluctuation in the beliefs of teachers is apparent to anyone who has the eye to see the differences between the "new" schools and the "old," since what is thought to be important or unimportant influences what is done. Shifts in methods of teaching have probably resulted from trends in social outlook and from an increased understanding of the nature and behavior of human individuals.

The moil in which society has found itself in the past few years has increased the thinking of educators about the importance of rearing children who can do something to correct wrongs which we have accepted. The present state of affairs was precipitated upon a trend of thinking directed toward recognition of the importance of respecting the personality of each individual in the light of its potentialities for becoming effective in society. In much of the recent University instruction teachers have been helped to see that children learn better if they are interested in what they do and have a responsibility for it. Stress has been placed on the interaction of various aspects which make up the whole personality—physical, mental, emotional, and social. Children have been seen to be happy and normal when they have freedom to express themselves through the outgoing exercise of all powers. The Mental Hygiene point of view has doubtlessly influenced this educational thought to considerable extent by showing the pernicious effects of certain types of behavior which have a

mechanism of cause and consequence not always readily apparent. Commenting upon the contribution of Mental Hygienists, Professor Kilpatrick says:

"We have always known that some children are 'unaccountably bad' or distressingly sensitive or given too much to discouragement or to daydreaming. Thanks partly to Freud, but also to our own studies, we have come to see these and their like as forming a new kind of study to which we give the name 'mental hygiene.' . . . Mental hygiene, knows the danger points, watches for signs, advising the school in advance so that such maladjustments may be avoided, and the mental health of the children safeguarded. . . . Mental hygiene from this point of view becomes an essential part of each teacher's equipment. The time will surely come when all education for teaching will include this as a recognized part. . . . Mental hygiene has come to stay as a part of any first-rate educational program" (1).

According to their light teachers in the past decade have attempted to answer the challenge of their critics which were frequent in educational literature of five or ten years ago pointing out "lack of definite information about children even though there might be adequate information about the psychology of teaching" and the fact that "the behavior of the child receives attention only when it interferes with what the teacher is struggling to accomplish . . . (and) provokes repressive discipline directed toward the immediate symptoms rather than interest in the cause." With the trends of the times and under the leadership of a great "Progressive Education" movement effort has been directed toward giving freedom for outward expression, happiness in pur-

suit of individual interest, and satisfaction in achievement rather than in subterfuge.

What this study shows, albeit incompletely, is the struggle toward new viewpoints in education, a shift in which there are still conflicting attitudes and no settled conviction. Greater basic understanding is still needed. Translated into practice many false interpretations are clear. Some teachers are so concerned about making children happy that they spoil them. Sometimes there is such an attempt to give children freedom that it sweeps beyond all bounds and results in license. Again the rights of the individual are so stressed that the good of the group is overlooked. With the increased recognition of the importance of recessive, introverted types of reaction, has appeared a consequent trend toward liberation from traditional social conduct. However, in lifting from children a strict and unreasoning external regard for God, man, and social custom, it would be unfortunate indeed if social integrity should be sacrificed. Reactionary outbursts against authority may assume less importance when judged objectively in the light of consequences to the growth of the child than they did when evaluated against the comfort, traditions, and sensitivities of the teacher, yet it may still be regarded as a serious matter for children habitually to resort to behavior of an anti-social though expressive character.

If in the apparent shift of attitudes of teachers toward the behavior of children there could be proven a universal trend toward conscientious study of the nature and needs of child-

hood, and of the qualities of conduct in a desired society, there would be which children need for functioning great hope for the future of education.

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Measuring Emotionality in Infants

A Tentative Experiment

KATHARINE M. BANHAM BRIDGES

PROCEDURE

AN ATTEMPT was made to measure emotionality in infants by taking records of the duration and frequency of emotional reactions during ten one-hour observation periods scattered over a month.

Twelve children in a single ward at the Montreal Foundling Hospital were the subjects of the brief investigation. The average age of the group was fifteen and a half months. The ages of eleven of the children ranged between twelve and seventeen months, while one mental defective was twenty-one months old. There were an equal number of boys and girls.

The method of systematic observation of the children in their usual environment was adopted. Descriptive records were kept of the emotional reactions of the infants and the provoking situations. The time of each affective response was recorded in minutes and seconds, with the aid of a stop-watch. Short cries or fleeting smiles too rapid to time accurately were arbitrarily counted as of two seconds duration. Many cries and smiles satisfactorily measured lasted about so long.

The observer paid particular attention to the babies' reactions to situ-

ations which had been found to be provocative of emotion in previous studies on the emotional behaviour of infants (1). The responses were recorded in two columns, one for all forms of distress and the other for all forms of delight or enjoyment.

The distress responses consisted in tearful crying, rigid tension and arrested activity, fretful whining or grunting, furious banging, and wide-eyed staring. The responses of delight consisted in laughter, smiles, running or jumping up and down, crooning vocalization, and patting.

SUMMARY OF RESULTS

The results, when classified and tabulated, showed striking differences among the children such as might be of clinical value in follow-up studies.

The frequency and total duration of the distressful and joyous reactions were calculated separately for each child and compared with the medians for the group. See table 1. The mean times of emotional reactions for each child were also computed. See table 2.

The results showed all possible variations. One or two children exhibited very little emotion of either kind. Some showed great distress and little delight, while others were more often

TABLE 1
Individual difference in emotionality of infants

SUBJECT	DISTRESS						DELIGHT					
	Direct		Indirect		All		Direct		Indirect		All	
	Time	Fre.	Time	Fre.	Time	Fre.	Time	Fre.	Time	Fre.	Time	Fre.
A. B.	72' 30"	17	93' 30"	20	166' 0"	37	0"	0	9' 53"	9	9' 53"	9
B. B.	3' 36"	15	2"	1	3' 38"	16	1' 48"	15	1' 12"	8	3' 0"	23
P. B.	7' 2"	17	27' 20"	5	34' 22"	22	2' 15"	20	2' 52"	16	5' 7"	36
J. H.	4' 40"	7	34"	5	5' 14"	12	1' 18"	13	38"	7	1' 46"	20
J. L.	11' 41"	11	1' 0"	15	12' 41"	26	1' 12"	11	24"	7	1' 36"	18
E. L.	3' 11"	10	16' 0"	4	19' 11"	14	6' 2"	41	14' 5"	5	20' 7"	46
D. M.	2' 54"	7	1' 10"	5	4' 4"	12	56"	11	39"	5	1' 35"	16
K. M.	7' 7"	15	25"	1	7' 32"	16	7' 46"	17	1' 32"	10	9' 18"	27
C. S.	9' 5"	28	24' 0"	4	33' 5"	32	2' 10"	20	38' 0"	16	40' 10"	36
W. V.	0"	0	0"	0	0"	0	39"	8	40"	10	1' 19"	18
J. W.	1' 48"	12	17"	2	2' 5"	14	3' 10"	10	5' 40"	8	8' 50"	18
D. W.	58"	9	11"	2	1' 9"	11	7' 42"	42	3' 25"	14	11' 7"	56
Median.	4' 8"	12	47"	4	6' 23"	15	1' 59"	14	2' 12"	9	6' 58"	22

Key: Time, given in minutes and seconds, in the above table represents the total time of emotional reactions during ten one-hour periods of observation scattered throughout a month. "Fre." means the total frequency of these reactions.

TABLE 2
Individual differences in emotionality in infants

SUBJECT	MEAN TIME OF EMOTIONAL REACTIONS					
	Distress			Delight		
	Direct	Indirect	All	Direct	Indirect	All
A. B.	4' 18"	4' 42"	4' 30"	0"	1' 6"	1' 6"
B. B.	14"	2"	14"	7"	9"	8"
P. B.	25"	5' 28"	1' 34"	7"	11"	9"
J. H.	40"	7"	26"	5"	5"	5"
J. L.	1' 4"	4"	29"	7"	3"	5"
E. L.	19"	4' 0"	1' 22"	9"	2' 49"	26"
D. M.	25"	14"	20"	5"	8"	6"
K. M.	28"	25"	28"	27"	9"	21"
C. S.	19"	6' 0"	1' 2"	7"	2' 24"	1' 7"
W. V.	0"	0"	0"	5"	4"	4"
J. W.	9"	9"	9"	19"	43"	29"
D. W.	6"	6"	6"	11"	15"	12"
Mean.	43"	1' 46"	53"	9"	37"	22"

delighted than distressed. Some children showed frequent outbursts of emotion which lasted only a few seconds, while others remained emotionally disturbed or excited for many minutes at a time. The four children whose emotional reactions lasted a relatively long time had also a frequency of outbursts higher than the median for the group.

Interesting results were obtained when the distress and delight responses were further differentiated into directly and indirectly expressed distress and delight. The time and frequency of these different kinds of response were calculated separately. See tables 1 and 2.

"Directly expressed" distress was taken as that manifested in tearful crying with puckered face and open mouth. All other forms of distress were loosely classed as "indirectly expressed." They consisted chiefly in arrested movement and body stiffness, pouting, grunting, frowning, and occasionally in banging. "Directly expressed" delight was considered to be that exhibited in smiles and laughter. Other forms of delight, for purposes of general classification, were counted as "indirect expressions." These included shouting, thumb-sucking, jumping up and down, running, and patting.

The writer is well aware of the arbitrariness and dubious significance of this broad classification. Inhibited movement and body stiffness might well be considered as directly expressed distress. Also jumping up and down might be considered a direct expression of delight. On the other hand, in

previous developmental studies, crying and smiling have been found to be among the earliest definitive manifestations of distress and delight. They are the most fostered through social contact and experience. Other forms of expression of these major emotions develop later or become habitual due to peculiar circumstances. A knowledge of the duration and frequency of direct and indirect emotional responses, even in the above limited sense, may be of clinical value.

Further differentiation of reactions into spontaneous activity and inhibited movement would no doubt give results of interest both for clinical and educational purposes. The data collected in this little experiment were scarcely detailed or extensive enough to allow scope for such fine analysis. It was found possible, however, to spot children with a tendency to inhibition of movement during emotion, even from the time results as already classified.

An inhibitive tendency in distress was revealed by the scores perhaps more accurately than in the case of delight. For, since "indirectly expressed" distress refers chiefly to arrested movement, a high time or frequency score in this column might indicate such a tendency. The "indirect expressions" of delight, however, include some active movements. Thus a child who has a high time score under this heading may not necessarily be given to inhibitive types of affective response. On the other hand, a low score for "directly expressed" delight would mean rare smiles or laughter, the most ready

and normal manifestations of delight, and would imply a certain amount of inhibition or modification of response.

A tendency towards spontaneous and active expression of emotion, or towards inhibitive responses might also be found by comparing the relative duration and frequency of reactions. Inhibited behaviour was usually of longer duration than marked activity; whereas children whose scores showed high frequency of emotional response, whether distress or delight, were those who expressed their emotion in spontaneous activity, according to the descriptive records. See subjects A. B., E. L., and C. S. in table 2.

An attempt was further made to discover "emotional perseverators" from the time results; that is, children who are slow to recover from an emotional disturbance. But it was realized that they might be found both among those whose emotional reactions were of long duration, and also among those who showed a high frequency of emotional response. For, a "hangover," from a great excitement or disturbance may manifest itself in frequent little outbursts of hilarity or distress for some time after the event.

Since the situations in this study were entirely uncontrolled, a high time or frequency score for any one child would not of necessity mean a tendency to perseveration or extreme emotionality. For, it might be merely indicative of the prolonged presence or frequent recurrence of a situation especially provocative of emotion for that child at the time study was made. This fact, however, is significant and

important in itself and could be checked against subsequent scorings under different circumstances.

Although children with a tendency towards emotional perseveration, in general, might be discovered among those with high emotionality scores it was found impossible to differentiate further the various types of emotional perseverator; for example, those whose emotional adjustment to a persistent situation is slow, and those who show perseveration of emotion after the situation has changed. The rough time scores in this experiment include both these kinds of response. But, if it were so desired, time records could be kept of emotional reactions which persist after the removal of the initial provocative situation.

According to the findings of Cattell (2) it seems probable that a tendency towards emotional preservation is a handicap in "character building for reliability and tenacity of purpose." On the other hand, the instable flexibility which characterizes an "emotional perseverator" can be made a social asset. At all events the early diagnosis of such a personal idiosyncrasy would be of educational significance if not of special clinical importance.

A comment might be made here also with regard to emotionality in general. Even though a child be diagnosed as "highly emotional" with the aid of measures or ratings, this does not necessarily imply a prognosis of social maladjustment or psychoneurosis. An emotional child of ordinary intelligence can be so educated to adapt to his temperamental peculiari-

ties as to develop into a fine and perhaps brilliant personality. Indeed it is possible that an intellectually dull child may profit from the additional drive provided by an emotional nature, if he is adequately trained.

CONCLUSION

The method of measuring emotionality in infants by timing their emotional responses during a given series of observation periods is quite simple and may have distinct practical value. Certain drawbacks must, however, always be kept in mind. The method can only be used for comparing chil-

dren of the same age subjected to the same environmental circumstances. Different things, for example, are frightening or amusing to children of different age levels.

Moreover, no single rating of a child among his fellows should be taken as an indication of permanent emotional tendencies. Temperamental characteristics change continually with the environment, with health, and with social situations. But a series of such measures of emotional reactions taken at intervals of months or years might uncover certain relatively stable temperamental trends.

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Time-Sampling Techniques¹

WILLARD C. OLSON AND ELIZABETH MECHEM CUNNINGHAM

THE wide-spread use of direct observation in the study of behavior has resulted in a number of requests for a bibliography of those methods which have been variously characterized as measurement by time sampling or by repeated short samples. The writers have here attempted to bring together the studies printed in English which contain descriptions, adaptations, evaluations, or general discussions of the method. The references were secured by a survey of the published literature, in addition to replies from letters of inquiry to all individuals and institutions known to have made some use of the method. In the letters of inquiry, lists including studies accepted for publication, studies completed but not published, and studies in progress were also secured. The completed studies have been included in the bibliography in those instances where there was an opportunity to examine them. In general, the references have been discussed from the point of view of their contribution to the methodology, rather than from the point of view of the contribution of the study to the specific problem presented.

¹From the child development laboratories of the University Elementary School of the University of Michigan.

SUMMARY OF INITIAL INVESTIGATIONS

Impetus to study by direct observation was given by Olson, 1926-27, working as a fellow of the National Research Council Board of Fellowships in the Biological Sciences. In studying the nervous mannerisms of children, he attempted to apply the general principles of scientific measurement as evolved in biometric work to observations of behavior. These principles include the general requirements of accurate observation; i.e., the definition of a unit, the delimitation of a field of observation, and the need for repeated samples (determinations) for accurate measurement. Thus, as applied by Olson, the "time-sampling technique" was characterized as the *systematic recording* of a definitely *delimited unit* of behavior described in terms of action over a *stated time interval* yielding *quantitative individual scores* by means of *repeated time units*.

The general procedure and results of the application of the method were first described at a meeting of the American Psychological Association, December, 1927 (39). A monograph report of the work was not available until 1929 (40), although Anderson commented briefly on the method and data of Olson's study in the report of

the conference on research in child development of the National Research Council Committee for Child Development in May, 1927 (1). The monograph contains an account of the development of the time-sampling technique in its original form and its application to various categories of so-called nervous habits. In the final form used in the investigation, twenty five-minute time samples were employed and only one category of behavior observed at a time. Experimentation was conducted with time samples of five and ten minutes, and with observations on the same and on different days. Data are presented on the reliability of the method and on the distribution and incidence of habits in preschool and school children. The general principles employed in the method were adopted at a number of child research centers, with further inquiry into the range of application of the method and further critical study of the assumptions.

Goodenough (16) reviewed the work of Olson and presented illustrative data on the application of the general method to behavior studies in the Institute of Child Welfare of the University of Minnesota. Some experimenting was done with a technique for weighting each time unit as well as the division of one-minute observational periods into ten-second intervals. Reliability coefficients are reported for observations on physical activity, general activity, laughter, conversation, social participation, leadership, anger, dramatic play, self-help, response to food, and reluctance. Delimited definitions of overt be-

havior to be included in each category are not reported in detail. A brief description of Parten's approach to the study of social reactions was included in the report.

Published detailed accounts of portions of Parten's work have recently appeared. In the first report (51) data on social participation among preschool children are presented. The categories of behavior used were named (1) unoccupied behavior, (2) onlooker, (3) solitary independent play, (4) parallel activity, (5) associative play, and (6) coöperative or organized supplementary play. Each nursery child was observed for one minute each day with a systematic rotating plan of observation to insure randomness of time-sampling for the various children and for the periods of the day. Twenty one-minute samples were used to secure a measure for each child. By weighting the occurrence of behavior in each category from -3 for unoccupied behavior to 3 for coöperative play, a measure of social participation was obtained for each child. Reliability was studied by the odd-even method and by check observers. Relationships are reported between the types and quantity of social participation and such variables as age, intelligence, teacher ratings, and nursery school experience. More recent publications analyze data on leadership behavior (52) and social play (53) gathered during the course of the same investigation.

A preliminary report by Thomas and her associates (64) described the work in progress at the Child Development Institute of Teachers College.

The introduction contains a brief statement of the problems of experimental sociology. The major problems of methodology have been viewed as (1) control of the observer, and (2) the definition of units. Of the nine preliminary reports contained, those by Barker and Loomis are the clearest examples of adaptation of time-sampling techniques in the sense of the survey.

Three reports concerning methods by Goodenough (18), Olson (42), and Thomas (65), at the Ninth International Congress of Psychology, December, 1929, at Yale University, indicated considerable similarity in the general conclusions which had been reached for the fields represented. Discussion of the general method with systematic implications have now appeared in several textbooks, notably those of Goodenough and Anderson (20, p. 246 ff., 255 ff., 334, 430 ff., 534), Symonds (63, p. 23-40), and Murphy and Murphy (37, p. 214-19, p. 223-27).²

Distinguishing Features

Modifications of the general technique and developments from other beginnings have now become so numerous that it is rather difficult to decide what investigations shall be styled as time-sampling studies. The term "time sample" does not, of course, specify all of the characteristics of the method. That term was used by Anderson in his introduction to

Olson's monograph as designating one of the prominent features of the method. Goodenough referred to the method as one of repeated short samples. Having in mind primarily the locale for the studying of problems, Olson described it as a natural history approach to the problem of measurement and described the identifying characteristics of the method.

An examination of the various studies reported suggests that a formal time-sampling technique will include the following features:

- (1) Observation by an eye witness.
- (2) Behavior to be observed defined in terms of overt action.
- (3) Behavior of an individual or group observed for a stated time unit, usually short.
- (4) A stated number of repetitions of the time unit employed.
- (5) An individual score based upon the *number of time units* in which the defined behavior occurs, or the *total frequency of occurrence of the defined behavior* in the total observational time, or the *average frequency of defined behavior* per unit of time.

Items 3, 4, and 5 are the characteristics which, in combination, suffice to differentiate time-sampling studies from observational studies in general. Each study, however, tends to modify the general method to suit the exigencies of the problem to be investigated. Variations in method, problems attacked, age level at which directed, and conditions of collection and recording will appear in the discussion and summary of the bibliographic material.

² A summary and analysis by Helen McN. Bott (9) and others of studies employing observational methods has appeared since the preparation of this manuscript.

In order to assist the discussion and to arrange the complex material for ready use by students of observational methods, the following pages have been organized so as to present a definition of terms, examples of behavior categories studied, developments in methodology, and a brief characterization of some of the major trends in the reliability and validity of the measures secured.

Terms used in time-sampling studies

The following outline represents an attempt to describe briefly some of the major practices in time-sampling studies:

I. Definition of Behavior

1. Action criterion: The observer is standardized by a description in terms of action of the behavior to be recorded for an individual.
2. Impression criterion: The observer is instructed to record individual behavior on a judgment scale for a trait which may have certain points defined in terms of "trait-actions." The observer may, however, be allowed to interpret the total situation.
3. Social-stimulus criterion: The observer records the behavior of an individual in terms of the reactions of others to his behavior.
4. Unit of behavior: The simplest unit in which the observations were described or collected.
5. Category: A coarser grouping of units of behavior on a common basis.

II. Timing and Sampling

1. Time sample: A constant length of time employed for each discrete observation of the defined behavior.
2. Distribution of time-samples: A statement as to how total be-

havior was sampled according to the time of day, month, or year, the activities engaged in, or the systematic variation of the order of observation for children in a group.

III. Distribution of Observer's Attention

1. Individual observation: The attention of the observer is directed to one individual at a time.
2. Group observation: All individuals in the group are observed simultaneously or a group record made irrespective of individuals.
3. Scanning: The eyes of the observer scan the observational field in cycles in a predetermined time sequence, noting each child, situation, or material at constant intervals.

IV. Method of Recording

1. Intermittent recording: The observer makes but one entry per child during one time unit, regardless of the frequency of the occurrence of the defined behavior within the time unit.
2. Continuous recording: The observer makes an entry every time the defined behavior occurs.
3. Photo-recording: Photographs are made of an area or event in a predetermined time-sequence.

V. Method of Scoring

1. Time-sample score: The score for a child is taken as the total of the number of time-samples in which the behavior occurred. Commonly used in intermittent recording.
2. Frequency score: The score for a child is taken as the total of recorded frequencies for the constant total time in the method of continuous recording.
3. Derived score: The score for a child is obtained by dividing the "frequency score" by the number of time samples. Many variations of derived scores occur, such as the translation of scores on a regular or irreg-

ular number of samples into occurrences per hundred observations, transmutation into age norms, grade norms, letter grades, percentiles, ratios, standard scores, etc.

VI. Conditions of Observation

1. Conditions of observation: The physical frame, social setting, subjects, time of day, experimental variables, position of observer, mechanical aids to recording, etc.

Types of behavior studied by time-sampling methods

A survey of the major categories of behavior which have thus far been attacked reveals, as would be expected, an emphasis upon overt action. The problem of implicit significance is either ignored or inferred from the nature and social valuation of the act or elaborated by statistical interrelationships. Time-sampling techniques have been applied to the following categories of behavior:

Aggressiveness	Physical Activity
Anger	Physical Contacts
Ascendancy-Sub-	Play Behavior
mission	Predormescent
Attention	Starts
Cooperation	Quarreling
Crying	Racial Attitudes
Eating	Reluctance
Emotional Insta-	Resistance
bility	Restlessness
Enuresis	Self-Help
Fighting	Social Contacts
Friendship	Stimulus Value of
Gestures	Individuals
Job vs. Non-Job	Stimulus Value of
Activity	Materials
Language	Talkativeness
Laughter	Teacher Responses
Leadership	Thumbsucking
Material Activity	Verbal Contacts
Movement	Walking
Nervous Habits	Whispering

Illustrative studies. Certain representative studies have been selected for the purpose of describing some of the problems attacked and the variations in methodology which have been introduced.

Arrington (3) has reported in considerable detail several aspects of the studies conducted at the Child Development Institute of Teachers College. Part I of her monograph is devoted to a critical examination of techniques for studying the social, material, and self components of undirected activity. Part II presents individual and normative data, the consistency of her evidence with data collected by other research workers on the same children, the interrelationship of variables, and a preliminary attempt at prognosis. The subjects of the investigation were 20 children, ranging in age from sixteen to thirty-two months at the beginning of the observation period. A considerable period of exploratory work preceded the development of a practicable technique. In the final approach to the problem, the investigator studied the following categories of behavior in children: (1) contact with material, (2) walking or other physical activity, not accompanied by contact with material, (3) absence of overt activity, (4) talking, (5) physical contact with persons, (6) laughing, and (7) crying. The behavior to be included in these classifications was described in some detail, and a code was used in recording. Two experienced observers made simultaneous observations for five-minute intervals. One observer recorded the social and the other the material activities of the

children studied. At least twenty-four five-minute records were made for each child. The method of continuous recording permitted further fractionation of the time unit. Derived scores were obtained based on duration and frequency of the behavior. Reliability data are reported in detail. In terms of coefficients of correlation these were usually in the neighborhood of .90. She reports that in her work she was impressed with the necessity of dividing the total behavior complex into finer and finer units and of eliminating every element capable of variable interpretation by observers.

Earlier reports in the Child Development Monograph series by Barker (5) and Loomis (35) illustrate the development of the approaches to the same central problems as are reported in Arrington's study. Similarly, in her investigation of the initiation of social contacts by preschool children, Beaver (6) utilized a code which provided for the recording of variations of both material and verbal contacts. From twenty-four to thirty-three samples of five minutes each were collected for each child. Several types of derived scores were obtained in terms of contacts initiated and received, adult vs. child contacts, range of contacts, and ratio of contacts initiated to those received.

In her investigation of the resistant behavior of preschool children, Caille (10) secured twenty-four time samples of five minutes duration for each child. The children were observed in rotation with the series varied so that the behavior sample for a given child would fall at different times

during the observational period. As a rule, a child was observed only once on a given day. Simultaneous observations were made by a second observer as a check on the investigator's reliability. Methods of recording permitted the use of total frequency scores and subdivisions of the total score in terms of resistance to adults, to children, etc.

Thomas and her associates have continued and extended their work on observational methods in connection with the program of the Yale Institute of Human Relations.

Loomis (36) has reported a preliminary application of sampling methods to work situations in industry. One person is observed at a time, five-minute samples are used with continuous recording, so that fractionation in terms of five-second or one-minute intervals may be made. A total of four hours of observational time in one of the earlier investigations has been distributed over a five-month interval. Such large categories as "job" and "non-job" activities have been studied. The problem has been to discover meaningful units and the requirements of an adequate sampling. Observations have been made in kitchens and cafeterias, and in manufacturing plants having numbers of workers at similar machines.

Arrington (4) has described the application of observational procedures to the cinema. Three observers viewed 14 films, using a local theatre as a laboratory. Records of language and physical contacts of the characters were studied both by repeated and simultaneous observations. The recording method permitted analysis

in terms of five-second intervals. The study has been carried forward sufficiently to note the high percentage of agreement among observers, the mechanical difficulties encountered, and to indicate promise as a means of training observers and studying methodological problems of observational measurement. The feasibility of repetition of the situation and having mechanical checks expand the possibilities of analytic study of technical issues. In the motion picture analysis, Thomas (68) reports the use of a constant rate moving paper with an automatic time signal as an aid to the observer.

A recent comprehensive publication by Thomas, Loomis, and Arrington (69) presents in greater detail social-material-self activity patterns in young children, in a trade school group of older children, and in an adult industrial group. About one-half of the volume is devoted to the study of observer reliability as checked in a variety of ways by recording the behavior of characters in motion picture films. Preliminary reports of these activities have already been noted, but the interested reader should consult the more detailed account.

Washburn (71) has analyzed the behavior of children as they encounter a nursery school group in the Guidance Nursery of the Child Development Institute of Yale University for the first time. Three five-minute time samples were employed, and the behavior to be observed shifted with each five-minute interval. Thus, the first five minutes were devoted to social contacts and material contacts. The second five minutes were devoted

to a record of gross muscular activities, and the third five-minute period to vocalization. The number of objects handled was recorded in each of the three periods. Continuous recording was practiced by a checking method, and the checks were subsequently translated into letter grades on the basis of frequency within the interval.

The technique employed by Lee (33) in a study of emotional instability in nursery school children from the University of Chicago Coöperative Nursery combines a three-minute time sample with a graphic record of shifts of mood by twelve fifteen-second divisions of the sample on a judgment scale with seven steps defined. The scale ranged from audible expression of rage or grief to audible expression of pleasure. The three-minute graphic records were distributed so as to obtain a random sample of the child's behavior. Two types of derived scores were obtained: one representing frequency of shifts of mood, and one the average mood level.

Koch and Streit (28) combine the direct observational approach using short time samples with the judgment technique characteristic of well-constructed rating scales in which steps are defined by action. In a study of 50 preschool children from the University of Chicago Coöperative Nursery, they emphasize the possibility of assigning in each brief time interval a judgment based on a general impression which may include more of the "Gestalt" than would the recording of specific overt action. It is evident in their study that useful objective data can be secured with this modification when preschool chil-

dren are observed for fifteen one-minute samples scattered at intervals of about a week. Reliabilities for derived scores based on mean ratings in each interval compare favorably with other recording methods. Koch (29) has also illustrated the agreement of time-sampling data on the social adjustment of children with test data on popularity as obtained by the method of paired comparisons.

In a study of friendships among children in the Institute of Child Welfare of the University of Minnesota, Challman (11) made a record of the names of the children who were found in the same play groups. His definition of group membership required a minimum presence of fifteen seconds in an association with two or more children. Changes of fifty per cent in group membership constituted a new grouping. He insured equality of observational sampling by intermittent recording by five-minute periods. Records were also obtained by nine other observers under less systematic conditions. The number of times each child was found in a group with every other child was tabulated. A derived score was then calculated which gave the number of times per hour each child associated with each of the others. This was termed a "friendship index." Many of the current techniques for the study of friendships are involved in the recent report by Green (21) from the same institution.

Choice of companions has been studied further by Hagman (22) at the Iowa Child Welfare Research Station. A scanning technique was employed with criteria for definitions of companionship at the moment of

observation. Observations were begun with a different child each day to allow for distribution of samples over the total time. A three-minute time interval was employed for each cycle of observation of the group. A derived score was obtained for the reaction of each child to each of the other members of the group in terms of the ratio of actual reactions to the maximum of possible reactions.

Dow (13) contrasted the play behavior of artistically superior and inferior children. The status of these children with reference to artistic capacities and abilities was determined by concomitant studies in the psychology of art under way at the University of Iowa. She made use of a code and observed one child for one minute, then observed the next child, and secured differentiation among the children by repeated observations on the same and many days, distributed over a period of about six months. Reliability was studied by correlation and by the percentage of correspondence between simultaneous records of observers. The conclusion that the artistic group shows greater response to play materials and equipment, when they are present, is of fundamental interest. Differences are not so marked when equipment is absent from the playground. Her comparisons of equipped versus non-equipped playgrounds show a number of conclusions in common with those of Wilker (73).

Several studies have been reported in which the actual recording was of the diary type, with an attempt to get a complete account of everything that happened, and a subsequent de-

vising of categories for the analysis of the material.

In the study of the unsupervised behavior of a group of institutional children, Smith (59, 60, 61, 62) and Reckless (54) had observers make continuous observations of one child at a time, with a sampling of 20 five-minute observations on each child. In these studies, Smith introduces an interesting variation from the usual method of reporting reliability. For example, he has taken the record for a single child, made by two or more observers, and has analyzed the records in terms of the frequencies with which the categories are represented in the record of each observer. His coefficients thus reflect the consistency with which observers secure the same distribution of behavior items in the various categories for a single child. His coefficients represent reliability of recording and adequacy of sampling for the behavior pattern of individual children, rather than the values for the prediction of individual behavior as compared to a group. By constructing categories of varying degrees of inclusiveness, he concludes that the utilization of the larger and more inclusive categories insures more satisfactory reliability. His procedure in the analysis of the record is to take the running account, and with a code of 62 items, to code the diary record with the appropriate number.

Belcher (7), in a study of teacher-child relationships in a kindergarten, illustrated the application of time-sampling techniques to a running account of behavior collected in diary form without a pre-formulated plan for analysis. The subsequent analysis

was made possible, however, because the diary had been taken for an hour a day on six different days. In connection with this material, the dependence of reliability on the coarseness of categories and the repetition of observation is again illustrated.

In a portion of her study on play—behavior and choice of play materials of preschool children, Van Alstyne (70) made use of a formal time-sampling method. In the study of uses of materials and their social values, each child was observed for fifteen seconds as the time unit. The observer rotated the observations among the various materials, according to a definite list, such as blocks, clay, crayons, etc. When the list of 25 materials had been checked through in this manner, the process was repeated. Observations were thus rotated by scanning successively various portions of the observational setting. This process was repeated, so as to get a large sample of the total behavior of the child. Since variable times for the use of specific material was the problem for investigation, a constant time unit was not employed in the portion of the study devoted to securing the attention span for various types of material. Sampling was used in the sense of distributing these observations over various days and times of day.

Wrightstone (76) has adapted certain features of the method of time sampling to the measurement of some of the complex performances of children in school settings. His interest was in determining whether some of the outcomes claimed for experimental school practices could be appraised

by the techniques. In his investigations, he has developed several codes designed to aid the observer in an objective evaluation of each of the groups of behavior with which he has worked. These include codes dealing with Cooperative Group Planning and Discussion, Voluntary Movement and Conference, and Pupil Participation in School Control. Observations were made simultaneously for all children in a group. The method of recording permitted the analysis of each category as a whole, or in terms of subclasses of a more specific character. Recording was continuous rather than intermittent, and time was somewhat variable. Repeated observations were employed. Reliability figures obtained to date in Grades One through Six compare favorably with other time sampling studies and with test methods. Since the behavior appraised involved pupil responses, and the conditions of observation included unequal numbers of children for unequal times, Wrightstone was led to the determination of a derived score which was obtained by dividing the actual score by the pupil's share of the total class time. This investigation is being continued and expanded and in its entirety will employ a variety of measurement methods.

Olson has continued and extended his work on time-sampling methods in the recently organized child development laboratories of the University Elementary School of the University of Michigan. Several studies have been reported growing out of the material secured in his investigation of nervous habits in children. One of the preliminary reports (41) stresses

method and notes possible application to the measurement of other personality traits and to the validation of test technique. A later report (44) notes in greater detail how repeated observations differentiate the same group of children from an "all or none" description in one observation to a continuous distribution in terms of amount for twenty observations. Figures on the relationship of repeated observations to the reliability of measurement are included.

In most applications of time-sampling methods, the attention of the observer is directed primarily to the behavior of the child. In an attempt to test the usefulness of the method under a particular assumption regarding the nature of personality, Olson and Wilkinson (49) had the observer direct the attention to an associate—in this study, primarily to the teacher rather than to the child. This was done under the assumption that an individual's personality is not defined by the responses he makes to others, but rather by the responses others make to him as a stimulus. A rather coarse unit of behavior was used, namely "such marked restlessness or inattention that the teacher feels the need of speaking to the child, or recalling his attention by direct word, look, or gesture." A five-minute unit of time was used, and two hundred observations were made during the course of the year. Marked individual and sex differences were obtained with this method, and the scores showed a high degree of both constancy and reliability.

In certain instances, the occasion seems to be the primary unit for the

collection of data. Episodic or diurnally fixed types of behavior are profitably studied on the occasion when the behavior may be expected to arise. The time of observation, as well as the length of observation, varies justifiably with individuals. Thus, by having observers make twenty records on consecutive days as to whether a predormescent start occurred in each of a group of 21 three-year-old children as they were falling asleep at nap time, Olson (48) secured a quantitative start score. The possibility of a start occurring in this instance is chronologically fixed in a time series, and fixed further, to some extent, by the variation of rhythms in the sleep behavior of the child. A somewhat similar situation arises in securing scores for enuresis. Thus, the same report describes the development of two types of enuretic scores based upon wet naps per hundred afternoons and wet nights per hundred. A justifiable variation in the general procedure is indicated. Scores based upon records of this type may, for methodological purposes, be called "episode scores." The latter example also illustrates the conception of derived scores, since irregularity in attendance made a statement in terms of a common number unintelligible. This, of course, is done with a full knowledge of some of the technical difficulties introduced.

Among completed but unpublished studies at the University of Michigan are those on gestures (24), talkativeness (58), language (34) (72), and eating and sleeping behavior (38) (74). Riseman has filed a preliminary report (56) of her investigation of the play and fight contacts of negro and white

nursery school children on the playground. This problem is of particular interest in view of the attention currently given to racial attitudes in social and political affairs. Wilker (73) is bringing to a conclusion a series of investigations on the effects of adding or removing equipment from playground areas on the behavior of children.

At the present time, Olson and Wilker (50) are analyzing the data from an investigation in which a film roll camera was used to "freeze" each aspect of the setting at regular time intervals. Time sampling by photographic recording has a number of things to recommend it for certain studies. The cost is much less than continuous recording by motion pictures, the analytic problem is smaller, the recording of non-pertinent aspects is minimized. It is probable that the method of photo-sampling lends itself better to the study of individual behavior and individual differences in reaction to materials than to the more detailed analyses of interaction. The possibilities and limitations in several areas of behavior are being investigated.

While apparently applicable to the description of the behavior of animals in uncontrolled or semi-controlled settings, but one report of a formal use of an adaptation of the method is to be found in this summary (40, p. 61-65).

Studies in progress. Reports on research in progress were received from the University of Chicago, Winnetka Public School Nursery, University of Kansas, Columbia University, Catholic University of

America, University of Minnesota, University of California, University of Michigan, Albany State College, Cornell University, State University of Iowa, Toronto University, Yale University, University of Tennessee, and the Merrill-Palmer School. The studies reported deal with compensatory behavior, play activities, gestures, consistency of behavior patterns, emotional behavior, pupils' movements in classroom situations, pupils' oral responses in classroom situations, aggressiveness, nervous habits, ascendance-submission, laughter, crying, language, talkativeness, pugnacious behavior, eating behavior, and the evaluation of the effects of habit-training programs. In several centers, an attempt is being made to secure annual appraisals by time-sampling techniques, so that problems of growth, constancy, etc., may be attacked. No attempt has been made at a complete résumé of studies in progress in the present report. Studies completed or partially completed but not published have been included in the bibliography in those instances where there has been an opportunity to examine the manuscript.

Reliability and constancy of time-sampling methods. As for the measurement problem in general, the term "reliability" is used with somewhat different meanings in time-sampling studies. Thus, reliability may be taken to mean the amount of absolute agreement on the measurement of identical behavior, the relative agreement on identical behavior, or the absolute or relative accuracy of the score in predicting similar types of

behavior on subsequent similar or dissimilar occasions. The reliability of time-sampling methods has been studied in terms of the percentage agreement of observers recording the same behavior, in terms of the totals of odd and even time samples, and by the comparison of two series of observations with a time interval between. Another technique has been the comparison of an observer's record with an objective standard, such as the motion picture.

It would be difficult indeed to state in general terms the types of reliability which may be expected. It becomes clear that the number of observations employed is a factor in determining the stability of a total measure, and, therefore, within limits, reliability is within the control of the patience of the observer. The reliability of the method also varies perhaps with the following factors: the length of the time unit employed, the behavior observed, the number of children observed simultaneously, the number of categories observed simultaneously, the fineness or coarseness of the categories, the conditions of observation, and the training of the observer. It would be premature to generalize on the direction of the effects of all of the factors, since they do not operate singly. Thus, it is conceivable that several categories with a complex coding scheme could be used satisfactorily when one child is observed at a time, while an equal degree of reliability might be obtained by using but one category and observing many children simultaneously. Such factors should be considered

when the observational set-up is being made, as well as during the subsequent evaluation of the data collected.

It appears to be fair to say that, whatever method of testing reliability is employed, the consistencies found are usually high in terms of the expectancy of persons who are unfamiliar with the methods. For fairly long series of observations of frequent behavior with simultaneous observers, coefficients in the neighborhood of .80 to .90 are rather easily obtained. While these are not high for individual prediction, they compare favorably with many test methods.

Correlations between scores obtained under various conditions and at varying time intervals tend to be positive, but values vary with the types of behavior studied. Reliability figures by simultaneous observation, by an "odd-even" method, or by two series of observations near each other in time sequence, tend to be higher than constancy coefficients. This, however, is in keeping with the results of other measurement methods. Since behavior is sensitive to fluctuations in situations, scores under different conditions tend to have greater significance in the portrayal of individual differences within a group than for absolute normative statements. This means that normative data must be collected under carefully defined conditions. The sensitiveness of the method to conditions, however, also indicates a large area of usefulness in describing the effects of experimentally introduced variables.

Some methodological difficulties in studies based on the direct observation

of behavior. The emphasis in time-sampling investigations has been on the study of overt action in young children under conditions in which a variety of behavior might be expected to occur. In some observational settings, particularly with older persons, the environmental controls of behavior have been so set as to restrict the field of observable action. A beginning has been made, however, on some of the narrower fields of action represented in groupings of elementary pupils (46) (76), high school (14) (69) and college students (40, p. 39), and adults in work situations (69).

The emphasis in studies to date has been on methods of investigation, individual differences, and intercorrelations of behavior. Where experimental factors have been introduced in the situations studied, the interpretation has of necessity been largely in terms of situation and response. The problem of the genesis and meaning of behavior has been attacked in several investigations and may yield increasingly to technical study. The relation of breastfeeding in infants to later predormescent starts in children (48), possible relations of verbalized fears and oral habits (40, p. 68), are illustrative of attacks on such problems on the superficial level permitted by present quantitative techniques. Mention should be made here of the work of Krout (31), who has conducted a number of preliminary studies of the relationship between overt behavior and parallel verbal stimulation, with an analytic account of possible mechanisms in terms of the individual's past history. One of his

earliest reports calls attention to the needs for research on the mental correlates of overt behavior. A list of overt gestures of reputed symbolic significance is given, together with an illustrative analysis of verbal stimuli by an instructor, and concomitant response on the part of the subject observed. The systematic implication and theoretical orientation for this approach may be found in his recent book on personality (32). The interpretation of overt behavior in terms of symbolic significance requires demonstration, but investigations can be set, quite apart from theoretical bias, when methods of controlling the stimulus, recording the movements, and securing historical and introspective data are combined.

There exists a large class of problems to which some of the general principles evolved in connection with time-sampling studies apply, but to which the specific techniques for measurement as enumerated for repeated short samples are not peculiarly applicable. Thus, if the behavior unit for the collection of data is a sequence of behavior acts fitting into a pattern, and if this behavior may be expected to occur in an episodic manner without an ascertainable position in the time sequence, and also may be expected to vary considerably in duration both

intra-individually and inter-individually, other methods of quantifying may be more adaptable to the problem. To go into such problems would, however, be a digression from the purpose of this paper.

Because of limitations of the observer, time-sampling studies tend to deal with categories of behavior recorded in a discrete fashion. This raises the question as to whether the dynamics of interaction can be completely and adequately described by simultaneous observers or by statistical descriptions based on the patterning and intercorrelation of variables. Progress on this problem is evident in the studies reported.

Behavior is commonly regarded as a function of both the individual and the situation. The variety of settings which must be sampled in order to secure a central picture of the responses of the individual in the same or similar situations still remains an open experimental problem.

CONCLUSION

The foregoing summary indicates a considerable amount of effort devoted to the development of observational studies by some method of repeated time samples. The results to date suggest large areas of usefulness for the methods as well as some of the technical difficulties encountered.

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The Developmental Age of Industrial School Boys

PAUL L. BOYNTON AND PAUL E. LOWE

THIS study was made on 90 boys in the sixth, seventh and eighth grades of the Tennessee Industrial School. This school is not a "reform school" as might be inferred from the name, but is a state school for dependent and what might be called mildly incorrigible children. Both boys and girls are in attendance, but are handled separately so that there was no artificiality in taking the boys separately for examination. All boys in the three grades chosen were involved in the study. The ages ranged from eleven years and nine months to nineteen years and ten months; three boys were 11; five were 12; sixteen, 13; twenty, 14; nineteen, 15; fifteen, 16; eight, 17; three, 18; one, 19. Of the total group of ninety, 38 were in the sixth grade; and 26 in each of the two remaining grades. The tests used were Furfey's Revised Scale for Measuring Developmental Age in Boys, and Otis' Self-Administering Test of Mental Ability, Intermediate Examination.

In Furfey's explanation (2) of his term "developmental age" he defines it as "the progressively increasing and non-intellectual maturity of general behavior which shows itself in the growing child's play preferences, in his fantasy life, in his choice of books and movies, in his ambitions, and, in

general, in his whole behavior type." Again, the statement is made that "the existing evidence tends to show that there is little or no correlation between mental age and developmental age, if the effect of chronological age is eliminated." Still further, after mentioning the fact that developmental age scores increased with age from ages eight to twelve, Furfey says that the scores increase "more sharply from age twelve to age sixteen. . . . It is a tempting theory that the acceleration in developmental age after twelve is due to the dawn of adolescence." He recognizes the limitations of the last interpretation or suggestion, however. With these statements and hypotheses before us certain of the findings of the present study may be particularly significant.

DEVELOPMENTAL AGE AND MENTAL AGE

Where all 90 cases were combined in one general group a correlation of $+ .33 \pm .06$ was obtained between mental age and developmental age. While this correlation certainly is too low to possess significant individual predictive value, it cannot be cast aside as indicating no relationship between the variables, or as indicating that there is no tendency for one to influence the other. The most interesting feature of this relationship, how-

ever, is seen after the elimination or partialing out of chronological age. This procedure resulted in a correlation of $+ .47$. Since this coefficient was so strikingly high, when compared with the original coefficient of $.33$, an attempt was made to find what conditions in the data were most likely responsible for the increase in size. In order to make a rough survey of the situation rank order correlations were run between mental age and developmental age for each chronological age group from thirteen to sixteen, inclusive.¹ The coefficients thus obtained are shown in table 1. These data appeared to indicate that the age of 14 might be a turning point on either

TABLE 1

Correlation between mental age and de- velopmental age	CHRONOLOGICAL AGES			
	.13	14	15	16
	.11	.45	.21	.63

side of which different types of relationships might exist.

With the latter point in mind another general correlation was run between mental age and chronological age for all boys fourteen years of age and above. This resulted in a coefficient of $+ .47 \pm .07$. It is interesting to note that this procedure resulted in a higher final relationship and a greater increase in the coefficient than did

another procedure where a correlation was run between the two variables in question for all cases with mental ages of fourteen years and above, and eleven years and less. When this new group was studied with the three middle mental age years eliminated the correlation was $+ .43$. If the relationship between the two variables had been consistent throughout the ranges this technique should have been expected to have raised the correlation to approximately its highest point.

Since the foregoing condition was not found we are thrown back on our two correlations of $+ .47$, one a partial and one a zero-order correlation, for our basic interpretive facts. The partial correlation of $.47$, when judged along with the original simple correlation of $.33$, would appear to indicate that the relationship between mental age and developmental age is less than the relationship between brightness and developmental age, and, further, that brightness rather than mere mental maturity is likely to be significantly related to a boy's responses on the developmental age scale. When we return to the other correlation of $.47$ —where all boys of 14 years and above were used—we reach a similar conclusion. If, as many believe (1 and 3) intelligence maturity is reached at or about fourteen years of age, then the restricting of the group to those of fourteen years and above really makes all the mental ages measures of relative brightness instead of mere maturity measures. It is particularly significant that this empirical procedure resulted in a coefficient of exactly the same size, $.47$, as that which was obtained when the effects of chronolog-

¹ The rank order method was used for these four correlations because of the small number of cases in each age group. This insufficiency of cases rendered any method crude. Correlations were not run at higher and lower chronological age levels because of the exceedingly small number of cases in each age group.

ical age were partialled out of the general relationship by means of a statistical formula. Further, this lends confirmation to the idea that degree of brightness is a significant element in determining a child's response on the developmental age scale. At least, this appears to have been true for the boys involved in this study.

Developmental age and chronological age

Contrary to what might have been expected, in light of Furfey's statement on the point, there was no consistent relationship found between developmental age and chronological age. This is seen in table 2. Of

such a decided annual gain in developmental age, the median scores point still stronger toward non-relationship between the two variables in question. This idea is brought out with equal force when a new coefficient of correlation is computed for the 66 cases within the twelve to sixteen chronological age range. This coefficient is $+.09 \pm .08$. These facts yield scant support to any idea that developmental age, as thus computed, can be expected to show anything even approximating a consistent increase with increasing chronological maturity during that which we might call the early adolescent years. In fact, when the

TABLE 2

MEDIAN	CHRONOLOGICAL AGES								
	11	12	13	14	15	16	17	18	19
Developmental age.....	8-6	13-2	13-2	14-10	14-7	13-3	13-7	14-2	16-0
Mental age.....	12-8	12-4	11-3	12-9	12-10	11-8	10-9	11-10	10-7
Number of cases.....	3	5	16	20	19	15	8	3	1

course, the number of cases in most of the age groups was entirely too small to permit of generalization, even for a group of this specialized type. If we take ages thirteen to sixteen, inclusive, however, where the concentration is the greatest we find no consistent tendency for developmental ages to increase with advances in chronological age. In fact, it would appear from a study of the medians that for these four ages alone there is a very slight inverted relationship between chronological age and developmental age. When the age of twelve is included with the other four years, and this is the inclusive range which Furfey states is the one during which there is

entire group of 90 cases is included the coefficient of correlation between developmental age and chronological age is only $+.27 \pm .07$. Thus for the group as a whole there would appear to be little evidence in this study to support the belief that chronological maturity can be expected to be accompanied by developmental age maturity.

SUMMARY AND CONCLUSIONS

1. Contrary to Furfey's definition of the term "developmental age" this study tends to reveal something of an "intellectual" factor in that which the test measures.

2. Instead of there being "little or

no correlation between mental age and developmental age, if the effect of chronological age is eliminated," we find a very significant relationship. We are led to conclude that brightness, if not mental age, is significantly associated with ability to respond on the developmental age test.

3. Chronological age appears to be less closely related to developmental age than is mental age. In fact, this relationship appears to be so negligible, particularly from the standpoint of individual prediction, that it is pointless to attempt to speculate as to which measured factor is truly the dependent element in the relationship.

4. This study itself has the limitation of having been worked out on a special type of boy. In fairness to Furfey's own work we should recognize the fact that these results may indicate only that Furfey's conclusions are likely to be inapplicable for atypical populations such as the one used in this analysis.

5. If the developmental age scale is going to have practical value there is need for a more objective statement of that which it purports to measure. Its experimental validation depends on this. The present criterion is too elusive and intangible to be of great value in test standardization.

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Adolescent "Crushes"

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WHILE many psychological studies have been made of adolescent development, practically no attention has been given to an analysis of the normal fixations of this period. Many studies have been made of emotionally unbalanced adolescents and of sexual perverts but little psychological interest has been directed toward the study of the normal emotional reactions of the typical adolescent to the persons in his environment. It is the purpose, therefore, of this paper to attempt to determine the prevalence of the so-called adolescent "crush," the characteristic age at which it appears, its causes, effects and duration.

HISTORICAL SURVEY

What few studies have been made of adolescent crushes have, for the most part, been of a theoretical type and conclusions have been drawn from an analysis of a few cases. One of the earliest mentions of "crushes" is to be found in the work of Mantegazza (8) who, in discussing pathological cases, says that the emotion normally felt toward an individual of the op-

posite sex may suffer a change in its whole character or may be transferred to an individual of the same sex, to a lower animal or even to inanimate objects. Such a transfer, he contends, may be found in normal as well as in pathological cases.

Sanford Bell (2) is among the first to mention the normal sexual emotions of the early adolescent, but his study stops with the fourteen-year-old.

Ernest Jones (6) in analyzing some of the characteristic problems of adolescence, brings out the fact that the so-called homosexual phase is more common in adolescence than at any later age and that in different individuals, it varies greatly in intensity.

Moll (9) however, is the first psychological writer to acknowledge the "crush" behavior as a normal development. The second stage of the development of sexual impulses, which he calls the "undifferentiated stage," is one in which he claims that normal children often exhibit homosexual excitement. The object of this excitement, according to him, is often teachers, friends, governesses and school fellows. This inclination, according to him, often leads to bodily acts and to contact with the beloved person by means of embraces and kisses, without the necessary occurrence of manifestations on the part of the external genital organs.

¹ The senior author directed the study reported in this paper and prepared the manuscript for publication; the junior author carried out the study and submitted it as a Master's Essay in Columbia University.

Young (12) maintains that active homosexuality is approached whenever large groups of girls and women are found together. He believes that both young men and women have a tendency to show marked affection for persons of their own sex, which, in time, is apt to pass into normal heterosexual relationships.

L. S. Hollingworth (5), unlike Moll (9), maintains that before the onset of puberty, the child attaches affections to persons of either sex equally. But, if a definitely heterosexual attitude is not established in four or five years following puberty, it is not likely thereafter to come naturally and normally. Hollingworth is the first to describe "crushes" from a psychological angle. She writes that "among adolescents in segregated schools, whose members of the opposite sex are absent, we have violent 'crushes' involving members of the same sex. By crush is meant that species of absorbing affection which involves jealousies and demands the exclusive response of the object to which it becomes attached."

She maintains that the vague, unlocalized drives of sex are present in crushes and that, in the absence of more appropriate objects, they find expression in this manner. She also holds that "a study of the subject would almost surely show comparative infrequency of the crush in coeducational institutions."

Chadwick (3) in her chapter on "friendships and identifications," has given one of the most recent analyses of crushes in adolescent girlhood years. The following quotation expresses her point of view.

"The typical adolescent friendships of the 'crush,' 'pash,' or G. P. varieties, as they are popularly known at school, are usually of the simple, effusive, direct-love type. The two are devoted to one another. They go about together as much as possible, put their arms round each other's necks or waists, kiss each other, do everything together, and feel that this friendship will endure to the end of time. . . . The adolescent girl is commonly extremely jealous of her friends. . . . They allow their best-beloved no latitude. . . . In fact, they behave very much the same as the majority of older, heterosexual lovers. . . . We will be ready to admit that girls who are absorbed in the stress of a violent adolescent friendship, either with a girl of the same age, a little older, or with a mature woman, find it difficult to carry on the ordinary affairs of their daily life. . . . Everything else fades out, or is pushed into the background until the blaze of this fierce passion has burnt itself out. How far these relationships go, and what actual expressions of love gratification the participants allow themselves, naturally varies according to the degree of freedom possessed by each for deriving satisfaction from different forms of sexual requirements and love-play connected with the several component instincts. . . . Occasionally we shall find these friendships taking place among groups of several girls, friends, or school-mates, who share school days or holidays, and remain warmly attached throughout life. They may often continue this close friendship so that no other outside attachment manages to break through the union, and all the members of the little group avoid or refuse marriage, preferring their own, or rather one another's company, to any that men's society can offer them."

Arlitt (1) in her latest book, "Adolescent Psychology," has discussed the crush phenomenon in adolescence. In discussing emotional maturing, she brings out the following points concerning crushes: "Few individuals remain in the state of fixation on people

of their own age and sex. Where this has occurred, and the boy enters college still in the crush period with members of his own sex as the love objects, much tact and skill are necessary to cause a transference. If it persists much beyond the twentieth year, or even if it appears to persist much beyond the eighteenth, it might be well to consult a psychiatrist in order to be certain that the transference will take place and the boy pass normally from devotion to members of his own sex to devotion to members of the opposite sex."

And, in relation to girls, Arlitt states that "girls may stay in the 'crush' stage in which their attachments are solely with members of their own sex. It is not a serious matter is this crush stage persists until eighteen or nineteen years of age provided it is gradually disappearing at this time. At the same time it is well to know that crushes should not be encouraged, and that they should not give rise to any undue excitement. Treating them as a growth stage through which all girls normally pass and the length of which is a matter partly of individual difference is probably the wisest attitude."

PURPOSE AND METHOD OF STUDY

The purpose of the study to be reported below is to determine the prevalency of the heterosexual or homosexual attachments referred to above and their outstanding characteristics. As such a study naturally involves the problem of attitudes and feelings, the information was obtained directly from adolescents, rather than from observations of them.

To obtain the desired information directly from the adolescents, it was decided to use the questionnaire method. In spite of its many limitations and weaknesses, this method, it was believed, could give more accurate information about the subject than would be possible to obtain through the use of any other method.

Two questionnaires were used for this study. One was filled out by adolescents and by those past the adolescent years who attempted to recall their adolescent experiences as accurately as they could. The second questionnaire was given to teachers and counselors at summer camps, who, in many instances, were the objects of adolescent crushes or who came in close enough contact with the adolescent years to have had an opportunity to observe the typical "crush" behavior.

The questionnaires used for this study are shown on page 66.

Subjects

Although almost 2,000 questionnaires were sent out to principals of schools, college professors, high school teachers, camp directors and counselors who had agreed to distribute them, only 559 were answered and returned. These were distributed as follows:

	Male	Female	Total
Teachers.....	33	81	114
Counselors.....	21	74	95
Pupils.....	148	202	350

The questionnaires were distributed in boys' high schools, girls' high schools, coeducational high schools, men's colleges, women's colleges, coeducational colleges and universities, a coeducational junior high school, a

QUESTIONNAIRE FOR PUPILS

Date.....

Place from which this questionnaire was received.....

Instructions: Do not sign your name. Please check the answers.

1. Do you like affection? (Do you like to be liked?) Yes.....No.....
2. Are you affectionate toward others? Yes.....No.....
3. Do you make friends easily? Yes.....No.....
4. Have you ever had a so-called "crush" or been strongly attracted to anyone with whom you were not "in love"? Yes.....No.....
5. Did you feel this way about more than one person? Yes.....No.....
6. Were you the only child in the family the time you felt this way? Yes.....No.....
7. Did you confide in any friend or member of your family? Yes.....No.....
8. Did you have interests other than your school work? Yes.....No.....
9. Are you boy.....Girl.....

If you have been so attracted, kindly answer the following

10. Where did you meet this person?.....
11. Was this person male.....female.....?
12. Approximately what was his (her) age.....?
13. What was his (her) status or occupation?.....
14. What was your age at the time?.....
15. What was your status (pupil, camper)?.....
16. How long did you feel this attachment?.....
17. How old are you now?.....
18. Were you attracted to him (her) physically.....
mentally.....
morally.....
19. Did you attempt to copy his (her) mode of living.....
clothing.....
speech.....
ideas.....
mannerisms.....
vocation.....
20. Did you dream about him (her)? Yes.....No.....
21. Were you sentimentally inclined towards him (her)? Yes.....No.....
22. Did you write poetry to him (her)? Yes.....No.....
23. Did you give him (her) presents? Yes.....No.....
24. In his (her) presence did you feel superior.....
at ease.....
unusually talkative.....
self-conscious.....
embarrassed.....
inferior.....
tongue-tied.....
25. Did you flush or pale in his (her) presence? Yes.....No.....
26. When out of his (her) presence did he (she) occupy your thoughts to any extent?
Yes.....No.....

27. Did you neglect duties because of day-dreams of him (her)? Yes.....No.....
28. Did you confide in him (her)? Yes.....No.....
29. Did this person have any influence (or give advice) upon the daily decisions you made?
Yes.....No.....
30. Did he (she) influence important, lifelong decisions? Yes.....No.....
31. Did you avoid meetings with him (her)? Yes.....No.....
32. Did you avoid showing your admiration? Yes.....No.....
33. Did you try to be outstanding so that he (she) would notice you? Yes.....No.....
34. Did you see as much of him (her) as you wanted to? Yes.....No.....
35. Did this person show that he (she) liked you very much? Yes.....No.....
36. Did you want to fondle him (her)? Yes.....No.....
37. Did you actually do so? Yes.....No.....
38. What do you think he thought of you?.....
39. What do you think caused you to feel the way you did about him (her)?.....
40. Did you attend a boys'.....girls'.....coed.....high school?.....

Any additional information may be written on the reverse side of the page.

QUESTIONNAIRE FOR TEACHERS OR COUNSELORS

Date.....

Place from which this questionnaire was received.....

Instructions: Do not sign your name. Please designate the correct statements by checking or completing statements where designated.

1. In what capacity are you answering this? Teacher.....
Counselor.....
2. Are you male.....female.....?
3. How old are you now?.....
4. Have you had a pupil or pupils (campers) who have manifested profound admiration
(the so-called "crush") for you? Yes.....No.....
5. How old were they? (average).....
6. How old were you at the time?.....
7. In approximately what percent of pupils (campers) have you experienced this?.....
8. Have you taught both boys and girls? Yes.....No.....
9. Did you find fixations to be more prevalent among boys.....
girls.....
neither.....
10. Did they express their fondness verbally? Yes.....No.....
11. In your presence did the children feel superior.....
at ease.....
unusually talkative.....
self-conscious.....
embarrassed.....
inferior.....
tongue-tied.....
12. Did they flush or pale? Yes.....No.....
13. Did they confide their personal problems to you? Yes.....No.....
14. Did they try to be outstanding so you would notice them? Yes.....No.....
15. Did you reciprocate their affection? Yes.....No.....
16. Did they attempt to fondle you? Yes.....No.....

but their distribution is similar. It was noticed that every male medical student had more than one "crush" while the female medical students had less, proportionately. It was remarked also that while few "crushes" were reported in the Christian schools, the positive answers were almost universal in the Jewish Sunday School.

In inspecting the Teacher-Counselor responses to the same question (table 3 B), it is interesting to notice that

answer the question) noted "crushes" among all their pupils.

Table 4 designates where the persons who had the "crushes" met. Both boys and girls agree with respect to two places which are most common: school and parties or dances. It will be noted here that girls met more than twice as many of the persons they fixated at school, which is an outcome of the before mentioned teacher "crushes."

TABLE 2

Age of pupil or camper manifesting "crushes"—Teachers and counselors reporting (Question 5)

HOW OLD WERE THEY?	MALE				FEMALE			
	Teacher		Counselor		Teacher		Counselor	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Under 10					8	9.9	5	6.7
10-12	1	3.0			9	11.1	8	10.8
12-14	2	6.0	3	14.3	9	11.1	10	13.5
14-16	5	15.1	3	14.3	11	13.6	17	23.0
16-18	3	9.0			13	16.1	5	6.8
18-20					4	4.9	2	2.7
20-22								
22-25								
No answer	22	66.6	15	71.4	27	33.3	27	36.5
Total	33	100	21	100	81	100	74	100

although the highest percentage of female teachers claims "crushes" to be prevalent in only from one to ten per cent of their classes, the next highest figure is that which designates that "crushes" are prevalent among all of the pupils. This seems to agree more fully with the response of the female counselors. Most of the male counselors have noted "crushes" among fifty per cent of their campers, while the greater number of male teachers (excluding those who did not

These teacher "crushes" are illustrated in table 5 where only 3.4 per cent of the boys have fixated on teachers, while 21.8 per cent of the girls have such fixations. The significant figures in both columns refer to fellow students or pupils.

Table 6 gives the status of those answering the questionnaire. It is obvious that pupils or students predominate considerably.

Table 7 designates that pupils fixated mostly upon people between the

ages of fourteen and twenty-one, while the teachers and counselors report most fixations while they (the teachers and counselors) were be- most "crushes" last from one to six months, many from one week to three years, but few longer than three years. The duration of a large percentage

TABLE 3
Prevalency of "crushes"—Pupils reporting
(Questions 4 and 5)

	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Never been so attracted?.....	42	28.4	27	13.4
Attracted once?.....	31	20.9	54	26.7
Attracted more than once?.....	75	50.7	121	59.9
Total.....	148	100	202	100

TABLE 3B
Prevalency of "crushes"—Teachers and counselors reporting
(Questions 4 and 7)

PER CENT OF PUPILS WHO HAVE HAD "CRUSHES"	TEACHERS				COUNSELORS			
	Male		Female		Male		Female	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
100 (all)	6	18.2	8	9.9	2	9.5	11	14.9
90-100	1	3.0						
80-90			1	1.2			1	1.4
70-80			4	4.9			5	6.8
60-70			1	1.2				
50-60			2	2.5	3	14.3	7	9.5
40-50			1	1.2				
30-40			3	3.7			1	1.4
20-30			1	1.2			2	2.7
10-20			7	8.6			4	5.4
1-10	1	3.0	13	16.0	1	4.8	6	8.1
0	2	6.1	2	2.5				
"Small"			2	2.5			1	1.4
"Negligible"			2	2.5			1	1.4
"Very few"			2	2.5				
No answer	23	69.7	32	29.5	15	71.4	35	47.3
Total.....	33	100	81	100	21	100	74	100

tween twenty and thirty-five (table 7 B).

The duration of "crushes" can be seen in table 8. It would seem that

remains questionable due to the fact that "crush" continued at the time of answering. Such papers were inspected for the present age of the sub-

ject and the age at which he had the "crush." In almost every case there was no greater difference than one year.

According to table 9 it would seem that although boys were attracted, for the most part, to the "crush" because of physical or physical and mental attraction, girls were attracted mentally. Physical, and physical and

of the habits or attitudes of the "crush," but when they did, ideas and mannerisms show preference.

In reading table 11 it is evident that both boys and girls were at ease in the presence of the one fixated. The

TABLE 4
Place of meeting
(Question 10)

WHERE DID YOU MEET THIS PERSON?	MALE		FEMALE	
	Number	Per cent	Number	Per cent
School.....	21	14.2	65	32.2
Camp.....	4	2.7	10	5.0
Out of town.....	5	3.4	3	1.5
Home.....	11	7.6	15	7.4
Places of amusement....	3	2.0	4	2.0
Party or dance.....	22	14.9	23	13.9
Museum.....	2	1.4		
Street.....	4	2.7	7	3.5
Seashore.....	2	1.4		
Business.....	1	.7	8	4.0
Newspaper.....	1	.7		
Summer resort.....	7	4.7	5	2.5
Park.....	1	.7	1	.5
Church.....	1	.7	1	.5
No answer.....	63	42.6	55	27.0
Total.....	148	100	202	100

mental attractions score highly also but the mental attraction supersedes.

Any number of combinations were possible in answering question 19. Only the combinations which were checked, however, appear in the table which was prepared for this question (table 10). It is evident that the greatest number of boys and girls who answered this question copied none

TABLE 5
Status of occupation of the person fixated
(Question 13)

STATUS OR OCCUPATION	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Teacher.....	5	3.4	44	21.8
Counselor.....			5	2.5
Pupil (student).....	60	40.5	53	26.2
College student.....	1	.7	29	14.4
Camper.....	3	2.0	1	.5
At leisure.....	1	.7	1	.5
Salesgirl.....	2	1.4		
Theatrical.....	3	2.0	5	2.5
Clerk.....	2	1.4		
Coach.....	1	.7		
Stenographer.....	4	2.7	4	2.0
Working girl.....	2	1.4		
Writer.....	1	.7		
Guest.....	1	.7		
Waitress.....	1	.7		
Tramp.....	1	.7		
Nurse.....	1	.7		
Business.....			16	7.9
Army officer.....			1	.5
Lawyer.....			3	1.5
Model.....			2	1.0
Artist.....			1	.5
Monk.....			1	.5
No answer.....	59	39.9	36	17.9
Total.....	148	100	202	100

next significant figure is the percentage denoting self-consciousness. However, there is a marked difference between the two. It would seem that some of the responses are contradictory. This is caused by the fact that the subject

had more than one fixation, each of which brought about different responses.

TABLE 6
Status of subjects at the time of "crush"
(Question 15)

	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Pupil (student).....	67	45.3	141	69.8
College student.....	5	3.4	3	1.5
Camper.....	13	8.7	14	6.9
Counselor.....	1	.7	2	1.0
Hotel guest.....	2	1.4	1	.5
Working girl.....			1	.5
Lady of leisure.....			2	1.0
Bellhop.....	1	.7		
Vacationist.....	2	1.4		
No answer.....	57	38.5	38	18.8
Total.....	148	100	202	100

the subject talkative, whereas in table 11 we find self-consciousness predominating next.

It is interesting to note in table 13 that while the girls and boys reporting agreed upon liking affection, being affectionate toward others, making friends easily, having other interests, being sentimental, having the "crush" occupy their thoughts, having the affection reciprocated, the girls show a larger percentage who confided in a friend or member of the family than did the boys; and the boys show a larger percentage who wanted to fondle the one fixated and did so than did the girls.

Table 13 B summarizes the responses to the questions which are answered by "yes" or "no." The significant figures inform us that while few men teachers or counselors recog-

TABLE 7
Approximate age of the person fixated
(Question 12)

APPROXIMATELY WHAT WAS HIS (HER) AGE?	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Under 14	5	3.4	2	1.0
14-18	47	31.8	32	15.9
18-21	34	23.0	53	26.2
21-25	6	4.1	28	13.9
25-30			29	14.4
30-40	2	1.4	14	6.9
40-50			8	4.0
No answer	54	36.5	36	17.9
Total.....	148	100	202	100

The teachers' and counselors' responses (table 12) agree with those of pupils as regards "at ease," but the next significant percentage denotes that the teacher or counselor found

nized pupil or camper "crushes," two-thirds of the women teachers have witnessed such "crushes." It will be noticed also that few of the subjects flushed or paled; many of them con-

TABLE 7B

*Age of person fixated at time of fixation. Counselors and teachers reporting
(Question 6)*

HOW OLD WERE YOU THEN?	MALE				FEMALE			
	Teacher		Counselor		Teacher		Counselor	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Under 17								
17-18			1	4.8	1	1.2	1	1.4
18-20							1	1.4
20-25	5	15.2	3	14.3	9	11.1	8	10.8
25-30	5	15.2	1	4.8	29	35.8	32	43.2
30-35	1	3.0	1	4.8	14	17.3	5	6.8
35-40					2	2.5		
No answer	22	66.7	15	71.4	26	32.1	27	36.5
Total	33	100	21	100	81	100	74	100

TABLE 8

*Duration of "crush"—Pupils reporting
(Question 16)*

	MALE		FEMALE	
	Number	Per cent	Number	Per cent
1 week-1 month	7	4.7	9	4.5
1-6 months	25	16.9	40	19.8
6 months-1 year	15	10.1	27	13.4
1-2 years	10	6.8	37	18.3
2-3 years	8	5.4	8	4.0
3-4 years	2	1.4	3	1.5
4-5 years				
5-6 years			3	1.5
6-7 years			1	.5
7-8 years				
8-9 years				
9-10 years	1	.7		
Still continues	23	15.5	26	12.9
One night			1	.5
No answer	57	38.5	47	23.3
Total	148	100	202	100

TABLE 9

*Quality or qualities which stimulated the
"crush"—Pupils reporting
(Question 18)*

	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Physical attraction . . .	28	18.9	33	16.3
Mental attraction	18	12.2	72	35.6
Moral attraction	3	2.1	8	4.0
Physical and Mental attraction	26	17.6	3	15.8
Physical and Moral attraction	4	2.7	2	1.0
Mental and Moral attraction	5	3.4	6	3.0
Physical, Mental and Moral attraction	12	8.1	13	6.4
No answer	52	35.1	36	17.8
Total	148	100	202	100

fided in the one fixated and tried to be outstanding. It is interesting to note that while both men and women teachers report that a comparatively small

per cent of their "crushes" tried to fondle them, the men and women counselors report a slightly larger percentage of children who attempted this than of those who did not.

According to table 14, miscellaneous causes of "crushes" predominate. The miscellaneous group includes various combinations of the above qualities on that table, together with other

cases where the teacher or counselor recorded that the pupil was at ease, the next response showed that a friendship had been encouraged; where the first response was "tongue-tied,"

TABLE 10
Respects in which the one fixated was emulated—Pupils reporting
(Question 19)

DID YOU ATTEMPT TO COPY HIS (HER) —	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Mode of living	1	.7	5	2.5
Clothing			3	1.5
Speech	2	1.4	8	4.0
Ideas	8	5.4	23	11.3
Mannerisms	8	5.4	12	5.5
Vocation	1	.7	7	3.5
Mode of living and ideas			2	1.0
Clothing and mannerisms			3	1.5
Clothing and vocation			1	.5
Speech and ideas	1	.7	9	4.5
Speech and mannerisms	1	.7	3	1.5
Ideas and mannerisms			7	3.5
Ideas and vocation			4	2.0
Mannerisms and vocation	1	.7		
Mode of living, speech, ideas			1	.5
Mode of living, speech, ideas, mannerisms and vocation			1	.5
Clothing, speech, ideas			1	.5
Clothing, speech, mannerisms			1	.5
Clothing, speech, mannerisms, vocation			3	1.5
Speech, ideas, mannerisms			2	1.0
Speech, ideas, mannerisms, vocation	1	.7		
All	2	1.4	1	.5
None	45	30.4	48	23.8
No answer	77	52.0	57	28.2
Total	148	100	202	100

causes such as "wanted sympathy," "for companionship" and even "just an adolescent infatuation."

In table 15 we see that the majority of teachers and counselors encouraged a friendship. In recording, questions 11 and 17 were marked at the same time and it was noticed that in most

it followed that such teacher or counselor had ignored the pupil.

COMPARISON OF RESULTS WITH THE FINDINGS OF OTHER INVESTIGATORS

Although Binet considered homosexual attraction as perversions, he claimed that there was a latent pos-

TABLE 11

*Reactional tendencies in the presence of the person fixated—Pupils reporting
(Question 24)*

IN HIS OR HER PRESENCE DID YOU FEEL	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Superior.....	7	4.7	6	3.0
At ease.....	50	33.8	98	48.5
Talkative.....	6	4.1	8	4.0
Self-conscious.....	8	5.4	23	11.4
Embarrassed.....	2	1.4	6	3.0
Inferior.....			2	1.0
Tongue-tied.....	1	.7	4	2.0
Superior and at ease.....	1	.7		
Superior and talkative.....	1	.7		
Superior and self-conscious.....	2	1.4		
Superior and tongue-tied.....	1	.7		
At ease and talkative.....	5	3.4	7	3.5
At ease and self-conscious.....	2	1.4		
At ease and inferior.....			1	.5
At ease and tongue-tied.....	1	.7		
Talkative and self-conscious.....			1	.5
Talkative and embarrassed.....	1	.7		
Self-conscious and embarrassed.....	2	1.4	4	2.0
Self-conscious and inferior.....			1	.5
Self-conscious and tongue-tied.....			2	1.0
Embarrassed and self-conscious.....			1	.5
Embarrassed and tongue-tied.....			1	.5
Superior, at ease, self-conscious.....	1	.7		
Superior, talkative, self-conscious.....	1	.7		
At ease, talkative, self-conscious.....	1	.7		
At ease, self-conscious, inferior.....			1	.5
Talkative, self-conscious, inferior.....	1	.7	1	.5
Talkative, self-conscious, embarrassed.....			1	.5
Self-conscious, embarrassed, tongue-tied.....			3	1.5
Superior, at ease, talkative, self-conscious.....	1	.7		
Self-conscious, embarrassed, inferior, tongue-tied.....			4	2.0
Embarrassed, inferior, tongue-tied.....	1	.7		
None.....	1	.7		
No answer.....	51	34.5	27	13.4
Total.....	148	100	202	100

sibility in normal persons. From the number of girls' crushes of high school pupils on girls, we find that Mantegazza's latent possibility has become a reality. However, our results are

not as convincing in their numbers as was expected by the writers.

As can be seen in table 7 A, the results of this study disagree with the statement of Ernest Jones that the

homosexual stage is more often positive than negative at this age. We agreed with Jones when the questionnaire was made out, anticipating a large percentage of teacher, governess, or counselor crushes. However, the results have not justified this assumption.

Although Hollingworth does not

to overcome the lack of it in school. On the other hand, the results of this study are in accordance with her statement that "A study of the subject would almost surely show comparative infrequency of the crush in coeducational institutions," as is designated in table 7 A.

TABLE 12

Reactional tendencies of the pupils or campers in the presence of the person fixated—Teachers and counselors reporting

(Question 11)

IN YOUR PRESENCE DID THEY FEEL	MALE				FEMALE			
	Teachers		Counselors		Teachers		Counselors	
	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent
Superior.....					1	1.2		
At ease.....	8	24.2	5	23.8	30	37.0	19	25.7
Talkative.....	3	9.1			7	8.6	8	10.8
Self-conscious.....					4	4.9	4	5.4
Embarrassed.....	1	3.0			4	4.9	3	4.1
Inferior.....					3	3.7	1	1.4
Tongue-tied.....	1	3.0	1	4.8	3	3.7	3	4.1
At ease and talkative.....					1	1.2	2	2.7
At ease and inferior.....							4	5.4
Talkative and self-conscious.....					1	1.2	1	1.4
Talkative and inferior.....					1	1.2		
Self-conscious and inferior.....					1	1.2	1	1.4
Self-conscious and tongue-tied.....					2	2.5		
At ease, talkative, self-conscious....							1	1.4
Talkative, self-conscious, embar- rassed.....							1	1.4
No answer.....	20	60.7	15	71.4	23	28.4	26	35.1
Total.....	33	100	21	100	81	100	74	100

mention the prevalency of "crushes," one would assume that they were rather frequent, as they probably were at the time at which she wrote. However, home conditions have changed so that today pupils of segregated schools have sufficient heterosexual companionship outside of the schools

It is likely that some of the results of this study differ from those of previous studies because this study deals almost entirely with urban population. City people have more numerous contacts than rural people, giving them a greater choice of companions. It may be for this reason

TABLE 13
Summary of pupil's questions to be answered by "Yes" or "No"
(Question 1-3, 6-8, 20-23, 25-37)

	MALE						FEMALE					
	Yes	Per cent	No	Per cent	No answer	Per cent	Yes	Per cent	No	Per cent	No answer	Total
1. Like affection?	119	80.5	25	16.9	4	2.7	196	97.0	4	2.0	2	100
2. Affectionate toward others?	98	66.2	42	28.4	8	5.4	147	72.8	48	23.8	7	202
3. Make friends easily?	87	58.8	55	37.1	6	4.1	153	75.7	46	22.5	3	202
6. Only child?	23	15.5	101	68.2	24	16.2	32	15.8	156	77.3	14	202
7. Confide in friend or family?	51	34.5	79	53.4	18	12.2	100	60.3	68	33.7	12	202
8. Other interests?	105	71.0	29	19.5	14	9.5	160	79.2	28	14.9	14	202
20. Dream of him?	58	39.2	38	25.7	52	35.1	99	49.0	73	36.1	30	202
21. Sentimental?	72	48.6	21	14.2	55	37.2	111	55.0	49	24.3	42	202
22. Write poetry to him?	20	13.5	78	52.0	50	33.8	26	12.9	147	72.8	29	202
23. Give him presents?	38	25.67	60	40.5	50	33.8	33	16.3	139	68.8	30	202
25. Flush or pale?	26	17.4	71	48.0	51	34.5	58	28.7	111	55.0	33	202
26. Occupy thoughts?	81	54.7	14	9.5	53	35.8	134	66.3	37	18.3	31	202
27. Neglect duties?	30	20.3	65	43.6	53	35.1	52	25.7	117	57.8	33	202
28. Confide in him?	48	32.4	50	33.8	50	33.8	62	30.2	110	54.4	30	202
29. Influence daily decisions?	37	25.0	61	41.2	50	33.7	86	42.6	82	40.7	34	202
30. Influence lifelong decisions?	15	10.5	78	52.7	55	37.1	37	18.3	119	58.9	46	202
31. Avoid meeting him?	22	15.0	76	51.4	50	33.8	32	15.8	142	70.3	28	202
32. Avoid showing admiration?	43	29.1	53	35.8	52	35.1	92	45.5	78	38.6	32	202
33. Try to be outstanding?	57	38.5	42	28.4	49	33.1	75	37.1	96	47.5	31	202
34. See him as often as desired?	53	35.8	46	31.1	49	33.1	100	44.5	83	41.0	29	202
35. Did he reciprocate?	66	45.1	24	16.3	58	39.2	91	57.9	45	22.5	40	202
36. Want to fondle him?	78	53.7	16	10.8	54	36.5	67	33.1	100	49.5	35	202
37. Did you do so?	63	42.6	32	21.6	53	35.8	88	18.8	132	65.3	32	202

TABLE 13B
Summary of teacher-counselor questions to be answered "Yes" or "No"
(Questions 4, 8, 10, 12, 13, 14, 15, 16)

	MALE TEACHERS						MALE COUNSELORS					
	Yes	Per cent	No	Per cent	No answer	Per cent	Yes	Per cent	No	Per cent	No answer	Total Num- ber
4. Ever had a crushee?.....	11	33.3	22	66.7		100	8	38.1	13	61.9		21
8. Taught boys and girls?.....	8	24.2	3	9.1	22	66.7	6	28.6	1	4.8	14	66.7
10. Did they express fondness verbally?.....	6	18.2	4	12.1	23	69.7	4	19.0	3	14.3	14	66.7
12. Did they flush or pale?.....	2	6.1	8	24.2	23	69.7	2	9.5	5	23.8	14	66.7
13. Did they confide in you?.....	7	21.2	4	12.1	22	66.7	4	19.0	2	9.5	15	71.4
14. Did they try to be outstanding?.....	8	24.2	3	9.1	22	66.7	4	19.0	2	9.5	15	71.4
15. Did you reciprocate the affection?.....	6	18.2	5	15.2	22	66.7	3	14.3	4	19.0	14	66.7
16. Did they attempt to fondle you?.....	2	6.1	9	27.3	22	66.7	4	19.0	3	14.3	14	66.7

	FEMALE TEACHERS						FEMALE COUNSELORS					
	Yes	Per cent	No	Per cent	No answer	Per cent	Yes	Per cent	No	Per cent	No answer	Total Num- ber
4. Ever had a crushee?.....	55	67.9	26	33.0		100	47	63.5	27	36.5		74
8. Taught boys and girls?.....	40	29.4	12	14.8	29	35.8	35	47.3	12	16.2	27	74
10. Did they express fondness verbally?.....	25	30.9	29	35.8	27	33.3	32	43.2	15	20.3	27	74
12. Did they flush or pale?.....	10	12.3	41	50.6	30	37.0	11	14.9	27	36.5	36	74
13. Did they confide in you?.....	36	44.4	18	22.2	27	33.3	31	52.7	7	9.5	28	74
14. Did they try to be outstanding?.....	35	43.2	19	23.5	27	33.3	30	47.3	12	16.2	27	74
15. Did you reciprocate the affection?.....	23	28.4	30	37.0	28	34.6	33	43.2	24	32.4	17	74
16. Did they attempt to fondle you?.....	18	22.2	35	43.2	28	34.6	23	31.3	22	29.7	29	74

that we find less homosexual fixations than had been anticipated. Numer-

TABLE 14

*Causes of "crushes"—Pupils reporting
(Question 39)*

WHAT DO YOU THINK CAUSED YOU TO FEEL THE WAY YOU DID ABOUT HIM OR HER	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Personality.....	8	5.4	17	8.4
Physical appeal.....	7	4.7	8	4.0
Mental attraction.....	10	6.8	22	10.9
Physical appeal and looks.....			10	5.0
Miscellaneous.....	29	19.6	63	31.2
Don't know.....	17	11.4	12	6.0
No answer.....	77	52.0	70	34.7
Total.....	148	100	202	100

mately their own age but of the opposite sex.

2. Crushes, in general, last from a month to three years.

3. They are motivated by various reasons, mental and physical predominating, such as a desire for the companionship of someone of the same mental status, the appreciation of one gifted with unusual talent, the recognition of facial beauty or bodily grace, or the desire for sympathetic understanding which would incorporate both the mental and physical phases.

4. They do not influence the normal mode of behavior of the subject.

5. They are more prevalent among girls than boys.

6. Where they are homosexual in

TABLE 15

*Manner of treatment of those who had "crushes"—Teachers and counselors reporting
(Question 17)*

HOW DID YOU TREAT THEM?	MALE				FEMALE			
	Teachers		Counselors		Teachers		Counselors	
	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent	Num- ber	Per cent
Ignored them.....	5	15.1	1	4.8	14	17.3	6	8.1
Encouraged friendship.....	7	21.2	6	28.6	36	44.4	39	52.7
Acted casually.....					4	4.9	1	1.4
No answer.....	21	63.6	14	66.7	27	33.3	28	37.8
Total.....	33	100	21	100	81	100	74	100

ous and varying interests in city life may explain why, although the percentage of those having crushes is high, it is not quite so universal as had been expected.

SUMMARY

In the material presented above, the following outstanding points were noticeable:

1. Most adolescents have one or more crushes upon people of approxi-

their expression, it is among girls almost entirely.

Conclusion

Although at the beginning of this study it was anticipated that teachers and counselors would be the objects of crushes, this assumption has proven to be incorrect. Evidently the old-fashioned "crush" of a pupil for his teacher or a camper for his counselor

(which was often homosexual) has given way to a more modern "crush" which does not have as its goal the detailed and studied reproduction of voice, mannerisms, dress, ideals, et cetera, that was prevalent formerly.

Since the time in which previous educators wrote on this subject, conditions in the schools and homes have changed, coeducational schools have become popular and there has been less restriction in the home and since adolescents are restricted no longer in their companionships, it is natural that their fixations tend more towards heterosexuality than homosexuality as was the case due to very strict super-

vision of companions at the time in which most of these educators wrote.

However, we do find that camp life, where children and counselors are segregated for a stretch of two months, is conducive to "crushes" since the child has no outside or heterosexual contacts during the camp season.

We conclude, therefore, that if a child is the product either of a modern home or of a coeducational school of today, his adolescent fixations, if any, are likely to be directed heterosexually to a person of approximately his own age and are unlikely to effect his general mode of living or behavior to any appreciable extent.

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The Attendance of Nursery School Children

HAROLD H. ANDERSON

REGULARITY of attendance is a problem of first importance in the administration of any preschool, but especially is this true in those preschools that are maintained primarily for research purposes. When children are absent, overhead expenses go on just the same and research workers are often interrupted or obliged to extend their studies over longer periods of time. It is also quite probable that absences disturb the progressive development of child attitudes toward fundamental routine habits and delay the child's progress in social interplay. As a by-product of another study, a comparative analysis was made of the reasons for absences in the several groups of children enrolled in the preschool laboratories of the Iowa Child Welfare Research Station during the year 1930-1931 and in one group of three-year-old children enrolled during 1931-1932. Comparison is made between groups and between these records and four other published reports on nursery school attendance.

The preschool laboratories of the Iowa Child Welfare Research Station in 1930-1931 consisted of 4 age groups of children of two, three, four, and five years respectively. There were 2 groups of five-year-old children, one attending in the morning and one in

the afternoon. These groups were designated respectively as First Group, Second Group or Home Laboratory, Third Group, and Fourth Group or Junior Primary. The total enrollment for the four groups for the year was 103. Second Group, which was included in the records for a two year period, attended from 9 A.M. to 3:30 P.M., having lunch and an afternoon nap at school. The other groups attended half days only.

A number of selective factors determine the enrollment. The children must be in good health and of average or superior intelligence; the parents must be able to pay the enrollment and food fees and be willing to co-operate with the school. About half the children come from families of graduate students or university staff members. Children are usually brought by the parents in cars, though a number come in taxis and some walk. Each morning on arrival they are given an inspection by a graduate nurse. If a child comes with signs of nasal discharge or of inflammation or infection of any kind, he is sent home. The nurse keeps in contact, usually by telephone, with the parents of absentees. Separate attendance records are kept by the nurse and by the head teachers of each group. Original records kept by the teachers

are sent every three weeks to the office of the Director of the Station, carbon copies remaining in the files of each group.

A child is counted absent if he fails to come to school, if he is not accepted by the nurse at morning inspection, or

Table 1 shows the ages of the children, total number of days of school, number of children, mean daily enrollment, mean daily attendance, total child days enrollment for the year, total child days attendance, total number of absences, and the mean per

TABLE 1
Analysis of preschool attendance

GROUP	YEAR	AGE	CHILDREN	TOTAL DAYS OF SCHOOL	MEAN DAILY ENROLLMENT	MEAN DAILY ATTENDANCE	TOTAL CHILD-DAYS ENROLLMENT	TOTAL CHILD-DAYS ATTENDANCE	MEAN DAILY PER CENT OF ATTENDANCE	TOTAL ABSENCES
Iowa Child Welfare Research Station:										
I.	1930-1931	2 years	16	163	14.7	12.0	2394	1964	82.04	430
II.	1930-1931	3 years	23	163	17.5	13.1	2852	2136	74.89	716
III.	1930-1931	4 years	25	163	23.5	19.8	3835	3232	84.28	603
IV (A.M.)	1930-1931	5 years	22	162	20.8	17.3	3374	2799	82.96	575
IV (P.M.)	1930-1931	5 years	17	162	15.0	12.3	2431	1999	82.23	432
All.	1930-1931		103				14886	12130	81.49	2756
II.	1931-1932	3 years	21	165	19.4	15.8	3201	2615	81.69	586
St. George's School ..	1926-1927		14	108			2304*	1519*	65.90*	584
Washington Child Research Center. .	1928-1930	22 to 42 months	71						71.50	
University of Minnesota Institute for Child Research:	1925-1926**									
I.		27 months	28	112		19.0			67.60	
II.		45 months								
Sixty-Three Nursery Schools.	February, 1930				18.8				86.10	

* Data for three terms indicated.

** November 12, 1925 to May 14, 1926.

if after he has been accepted by the nurse he is sent home for any reason within the first hour. Reasons for absences are reported by the preschool nurse, the family physician, or the parent. Groupings of causes of absences have been made after the suggestions of the preschool nurse.

cent of attendance. Table 2 shows the causes of absences for the preschool children by groups for the year 1930-1931 and for the Second Group for 1931-1932. The total for all groups is also given. Comparable data for three other nursery schools which were obtained from their respec-

tive attendance reports are arranged in table 1. The mean enrollment and mean per cent of attendance are also given for the last five days of one week in February, 1930 for 63 nursery schools as reported to the White

attended with medical reasons preceding nonmedical in the tabulation.

Figure 1 divides the per cent of enrollment for the respective groups represented in tables 1 and 2 into segments showing the mean per cent of at-

TABLE 2
Analysis of causes of absences in the Iowa Child Welfare Research Station

CAUSES OF ABSENCES	YEAR						
	1930-1931						1931-1932
	Group						
	I	II	III	IV A.M.	IV P.M.	All	II
Common cold.....	329	428	294	308	177	1536	434
Per cent of all absences.....	76.5	59.8	48.8	53.6	41.0	55.7	74.1
Per cent of total days enrollment..	13.7	15.0	7.7	9.1	7.3	10.3	13.6
Temperature.....	8	8		1	2	19	1
Tonsillitis.....	5	5	5	3		18	
Croup.....	6	6		2	6	20	12
Laryngitis.....	5	6		20		31	9
Bronchitis.....	2	39			5	46	
Intestinal disturbances.....	7	35	24			66	5
Stomach upset.....	4	31	6	13	7	61	29
Eye infections (sty).....		2	17	14	5	38	24
Ear infections and mastoiditis.....	45	65	50	22	31	213	5
Skin eruptions.....	2	9	1	1	1	14	
Tonsillectomy.....			5			5	7
Asthma.....				3		3	5
Scarlet fever.....	5					5	
Measles.....					16	16	
Chicken pox.....			25	14		39	
Whooping cough.....		10	10	10	45	75	
Exposure to contagious disease...			27	64	18	109	
Miscellaneous medical treatment...			11	1		12	
Accidents.....			3	18		21	1
Parents' convenience.....	10	63	98	52	87	310	52
Fatigue, indisposition.....	1	9	2	14	3	29	2
No reason obtained.....	1		25	15	29	70	

House Conference on Child Health and Protection (3).

Tables 2 and 3 show what absences are due to common colds in percentages of all absences and of total enrollment. The causes of absences are

tendance for the periods of enrollment reported, and the per cent of the total number of child days enrollment in which absences are due to colds.

An important finding in table 1 and in figure 1 is the difference between

Second Group and the rest of the school. Excepting this group, the mean per cent of attendance for 1930-1931 hovers very close to the mean for all groups. The per cent of absences due to colds is about evenly matched for the two- and three-year-old children, but is greater for them than for the older children. Second

question still remains unanswered to what extent the generally rigid nursery school requirements are really preventive.

The attendance report (2) from the Nursery School Division of the St. George's School for Child Study at Toronto covers in some parts two terms and in others three terms of the

TABLE 3
Analysis of causes of absences in other nursery schools

CAUSES OF ABSENCES	ST. GEORGE SCHOOL	WASHINGTON CHILD RESEARCH CENTER	UNIVERSITY OF MINNESOTA INSTITUTE FOR CHILD RESEARCH**
	Year		
	1926-1927	1928-1930	1925-1926*
Common cold.....	302		515
Per cent of all absences.....	51.7	57.0	
Per cent of total days enrollment.....	18.5	16.2	
Temperature.....			4
Croup.....			9
Stomach upset.....			8
Ear infections.....			118
Mastoiditis.....			13
Tonsillectomy.....			17
Measles.....			109
Chicken pox.....			89
Whooping cough.....			29
Parents' convenience.....			13
Fatigue, indisposition.....			2
Miscellaneous.....			60

* November 12, 1925 to May 14, 1926.

** For groups I and II.

Group, however, has a considerably greater per cent of absences due to causes not so prevalent in First Group.

It must be remembered that the high percentages of absences due to colds would probably be reduced at the public school age. Many children excluded for running noses had no other symptoms of illness and were quite able to get about and play. The

school year 1926-1927. Some recalculations from the data presented were made in order to make comparisons with the Iowa attendance reported here. The per cent of absences due to colds given in this study for the Toronto school is not the same as that given in the Toronto report. For example, the Toronto report says, "All of these 15 children suffered from

'colds,' the amount of time lost ranging from four to forty-two days, or an average of over 20 school days out of a possible 108. Briefly, three-fourths of

sufficiently serious to seek the aid of a physician" (2, p. 156).

The possible attendance for the two terms reported was 108 days, but the

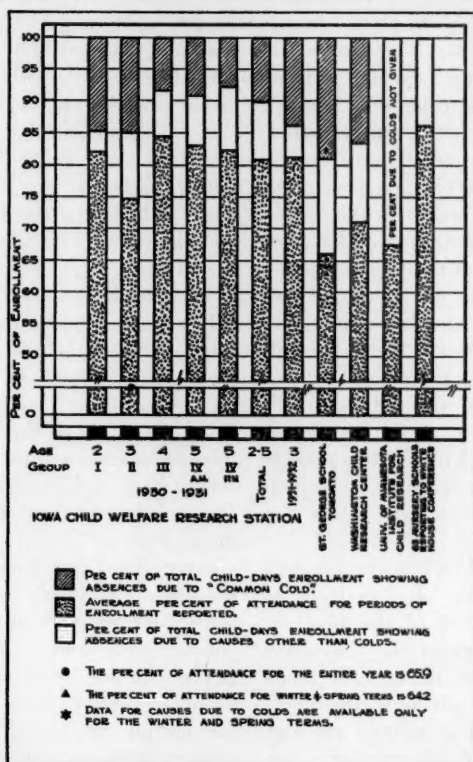


FIG. 1. PER CENT OF ENROLLMENT, ATTENDANCE, AND ABSENCES DUE TO COLDS FOR FIVE GROUPS OF CHILDREN ATTENDING THE PRESCHOOL LABORATORY OF THE IOWA CHILD WELFARE RESEARCH STATION DURING 1930-1931 AND ONE GROUP ATTENDING DURING 1931-1932 WITH COMPARISONS WITH THE NURSERY SCHOOLS AT THE ST. GEORGE'S SCHOOL FOR CHILD STUDY AT TORONTO, THE WASHINGTON CHILD RESEARCH CENTER, AND THE UNIVERSITY OF MINNESOTA INSTITUTE FOR CHILD RESEARCH

all the time lost and practically one-fifth of all the available school time is monopolized by this condition, although in only about half the cases was the condition considered to be

actual days attended varied considerably per child. If, instead of averaging means, the per cent of absences due to colds is computed from the original data, the "three-

fourths of all the available school time" lost to colds becomes only 51.71 per cent or slightly over half. The Toronto report considerably magnifies the rôle of colds as causes of absences in their nursery school group. However, even with this correction, colds at Toronto occupy a greater segment of the enrollment column in figure 1 than for any other group reported. This is also true of absences due to causes other than colds; the per cent of attendance at Toronto is the lowest among the various groups. The figure of 18.5 per cent of total days enrolled showing absence for colds is also greater than for any other group.

The Washington Child Research Center (4) reports attendance for two years, 1928-1930, with a total enrollment of seventy-one. The per cent of attendance of 71.5 for the two years is below all the Iowa groups, although 5.6 per cent above that given for Toronto.

John E. Anderson has given a very detailed report (1) of attendance at the Nursery School of the Institute for Child Research at the University of Minnesota for 1925-1926. Some of the causes of absences are reproduced in table 3 in spite of the fact that there are probably some arbitrary differences in classifying causes of absences. It is apparent that ear infections and contagious diseases, some of which were reported as epidemic in Minneapolis for that winter, accounted for much in keeping the mean attendance down to 67.6 per cent. An interesting detail is the low ratio of absences due to parents' convenience as compared with the Iowa children.

Sixty-three nursery schools reported to a committee on Nursery Education of the White House Conference on Child Health and Protection. Blanks were distributed and filled out as of March 1, 1930.¹ The questionnaires obtained "attendance in the week preceding that in which the Final Blank was filled out and the enrollment that week" (3, p. 59). The per cent of attendance given by these 63 nursery schools was 86.1 per cent. This is higher than the attendance records of any of the groups considered here.

The question is raised as to why the White House report gives a mean per cent of nursery school attendance so much higher than the other means reported in table 1 and illustrated in figure 1. Can it be that these nursery schools maintained for research are consistent though inadequate samples? Do parents withdraw children sooner in the case of illness in the average nursery school and thereby relieve the records of so many absentees? Do these four research nursery schools possibly have more rigid daily health inspections and reject more children for minor illnesses than is done in the average nursery school? Or is there some explanation in the fact that these 4 nursery schools are reporting for entire terms or years, while the 63 are

¹ The White House Conference Report on Nursery Education (3, p. 15) gives March 1, 1929, but the writer believes almost certainly that this is an error and that these questionnaires were distributed in 1930. The Foreword states (3, p. XV) that the first meeting was held December 13 to 14, 1929 at which "a report of projects within its field which might be undertaken by the Committee was submitted."

reporting for only one week in March, 1930? The means for February and March at the Washington Child Research Center (4) are below the per cent of attendance for the year, whether each year reported is taken separately or both together.

The material does not warrant making too strict comparisons between the attendance records of the various groups here considered. The numbers are small, the groups vary in age and

attendance throughout the school year for respective groups of Iowa children. In figure 2 the curves are superimposed for comparison. With the curves blocked off in monthly segments, April and May show much greater consistency in the curves than the other months. Nearly every peak for one group is offset by some valley in another. The latter part of January shows most of the curves proportion-

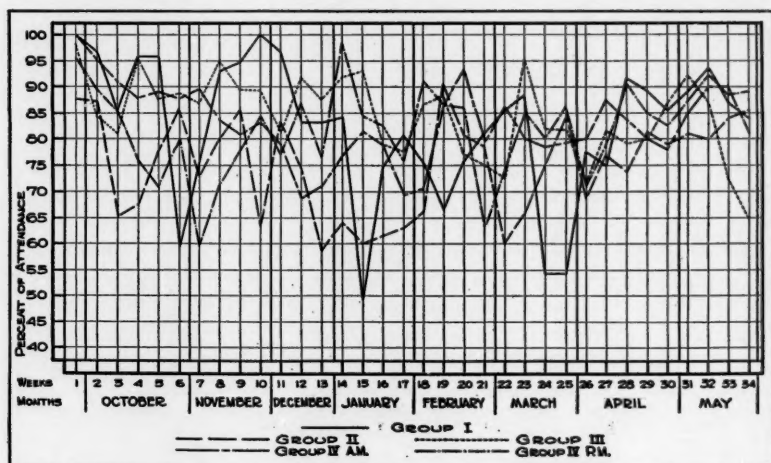


FIG. 2. WEEKLY PERCENTAGES OF ATTENDANCE FOR EACH OF FOUR AGE GROUPS OF PRESCHOOL CHILDREN, 1930-1931

number, and the reports are given for different years.

Because the question has been raised as to seasonal attendance, figure 2 is given showing the weekly per cent of

attendance throughout the school year for respective groups of Iowa children. The early part of February, with the exception of First Group, shows the curves tending upward. However, the general effect of the curves in figure 2 is one of contrast.

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Brief Reports

Standards of Development in Terms of Increments

IN SPITE of the energy which has been devoted to the construction of standards of development it is not difficult to point out inadequacies at many points. The available standards would be vastly improved if clearly defined homogeneous populations were employed, if not merely the abnormal fraction of one per cent but also the ten per cent who have received the least adequate care or who have histories of conditions known to retard growth were eliminated, if separate standards were set up for sub-groups of such selected populations as tall versus short or early versus late maturing children, if more care were given to the statistical statement of the norm in terms of averages, standard deviations, quartiles, and where necessary the 90th. and 10th. percentiles, and if more serious study were given to the significance of deviations from the average. Finally, standards would be much improved if they were stated in terms of annual or semi-annual gains and increments, in terms of progress rather than status. The judgment is ventured that future work on standards of development will and must move in the direction (a) of stating standards in terms of increments and (b) of sparing no labor to determine the significance of deviations from the average of such standards.

This paper employs measures of

height and weight for the purpose of illustrating a procedure and point of view which should be applied to all the many aspects of development and growth. The basic data were taken from Bird T. Baldwin's "Physical Growth and School Progress," U. S. Bureau of Education, Bulletin 1914, No. 10, in which he gives the heights and weights obtained from examinations repeated annually over a period of six years on a favored group of 50 boys and 50 girls originally age 7 and of 50 boys and 50 girls originally age 12. Table 1 presents the average number of pounds which will be gained in a year by sex, by age groups, and by weight groups together with the standard deviations of these gains. Thus, boys age 15 and 16 and weighing one hundred thirty or more pounds will gain in a year on the average 9.5 pounds with approximately 68 per cent of the gains falling between four and fifteen pounds. The heavier boys gain fewer pounds than do the lighter boys of these ages. Similarly, girls age 15 and 16 and weighing one hundred thirty or more pounds gain on the average 2.8 pounds while those weighing eighty to eighty-nine pounds gain on the average 6.2 pounds. The large standard deviations in comparison with the average for girls age 15 and 16 indicate that it is not unusual for them to lose weight during a period

TABLE 1

Pounds which will be gained in a year by sex, age, and weight groups

WEIGHT AND AGE	BOYS		GIRLS	
	Mean	St. Dev.	Mean	St. Dev.
Age 15 and 16				
130-	9.5	5.5	2.8	4.8
120-129	11.1	5.5	3.8	4.9
110-119	11.9	6.3	5.0	5.4
100-109	13.3	6.3	5.1	5.6
90-99	14.3	6.5	5.7	6.4
80-89	15.7	5.5	6.2	6.2

Age 13 and 14

120-			6.1	5.8
110-119	12.5	6.7	7.6	6.2
100-109	13.3	6.1	9.8	6.1
90-99	13.3	5.6	10.7	5.9
80-89	12.1	5.3	10.8	5.7
70-79	10.9	5.1	11.2	4.6
60-69	9.7	5.1	11.4	4.3

Age 11 and 12

100-	12.5	5.5	11.5	6.0
90-99	10.8	5.1	11.4	4.9
80-89	8.9	4.5	11.2	4.8
70-79	7.9	4.0	10.5	4.6
60-69	6.9	3.0	9.6	3.7
50-59	5.7	2.3	8.3	3.9

Age 9 and 10

80-	8.7	3.7		
70-79	7.8	3.1	9.0	4.1
60-69	6.7	2.8	7.3	4.0
50-59	5.2	1.9	6.2	3.8
40-49	4.2	1.6	4.3	3.2

Age 7 and 8

60-	6.7	3.2	7.2	3.8
50-59	5.7	2.8	5.4	3.0
40-49	4.9	1.9	4.5	1.8

of a year. In the age range 13 and 14 the heavier boys gain more than the lighter ones, while the heavier girls

gain less than the lighter ones. In the age range 7 and 8, 9 and 10, and 11 and 12 the heavier children consistently gain more than the lighter children and the variabilities of their gains are consistently greater. Table 2 presents similar data for height. In the

TABLE 2

Inches which will be gained in a year by sex, age, and height groups

HEIGHT AND AGE	BOYS		GIRLS	
	Mean	St. Dev.	Mean	St. Dev.
Age 15 and 16				
66-	1.6	.9	.3	.5
64-65	1.9	.9	.6	.5
62-63	2.5	1.0	.7	.5
60-61	3.0	1.0	.7	.6
58-59	3.3	.9	.8	.7

Age 13 and 14

64-	2.5	1.0	.9	.7
62-63	2.7	1.0	1.3	.7
60-61	2.6	.9	1.7	.8
58-59	2.6	.9	1.8	.8
56-57	2.4	.8	2.1	.8

Age 11 and 12

All cases	2.0	.7	2.4	.7
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Age 9 and 10

All cases	1.9	.4	2.1	.5
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Age 7 and 8

	2.0	.6	2.1	.5
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age range seven to twelve, the averages and standard deviations for different statures have been omitted since the data indicate that the correlations between height and gains in height are negligible.

On the basis of these data it is hardly

necessary to point out that, if standards of height and weight in terms of increments are to be constructed, such standards should take account of initial height and weight and of different variabilities for each sex, age, and weight and height class. Since some of the distributions of increments are skewed, the basic data should include medians and quartiles and possibly the 90th. and 10th. percentiles in addition to means and standard deviations. Since many school systems have been obtaining height and weight data at regular intervals it should not be difficult to construct such standards on the basis of many thousands of cases and to distinguish in addition socio-economic, rural-urban, and racial standards.

If such standards are to be constructed, however, it is most important to know beforehand the significance of deviations from such standards. Suppose that Johnny age 10 weighs 45 pounds and at age 11 weighs 50 pounds; while 50 pounds at age 11 is far below normal and while a 5 pound gain is less than average for boys age 10, the 5 pound gain is nevertheless better than the average for boys of his weight at age 10. That is, the hypothesis is offered that increments provide a better index of satisfactory development than the conventional height-weight-age-sex tables such as the Baldwin-Wood-Woodbury tables.¹

¹ Easily the best statement of the present status of the height-weight tables appears

Moreover, standards in terms of increments should be more practicable of application than procedure developed by Franzen (1). A test of the hypothesis requires the study of increments in relation to socio-economic status, morbidity, adequacy of diet, defects, dental caries, nutritional status as judged by a physician, and nutritional status as estimated by Franzen's procedure. Minor problems concern the most suitable period of time whether three months, six months or a year and the most sensitive and significant dimension whether height or weight, or chest depth or circumference of upper arm.

Theoretically, standards in terms of increments have many advantages over the familiar standards in terms of averages by age and sex. They emphasize progress rather than status. They measure primarily environmental factors operating over a short period of time whereas the conventional standards measure a complex of hereditary, constitutional, and environmental factors acting and interacting over a period of years. The variability of annual increments is necessarily much less than the variability of the gross measures; hence, standards in terms of increments should be more precise and specific.

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in editorial in *Jour. Am. Med. Assoc.*, 1933, 101, 369-370 and reprinted in full in *Am. J. Phys. Anthro.*, 1933, 18, 155-157. Fourteen references to the literature are given.

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can Child Health Association, 1929, pp. 138.

The Age at Walking of Children Who Run on All Fours

HŘDLÍČKA in his book "Children Who Run on All Fours" is of the opinion that the habit of running on all fours has the effect of producing a delay in the onset of walking (p. 48). The only evidence which he offers in support of this view is a few expressions of opinion from his informants. It is obvious that if children who use the quadrimembral mode of progression are late walkers, the retardation in walking may be associated with rather than caused by the peculiar pre-walking locomotion. But however that may be, it does seem possible that Hřdlička's subjects may be unusual with respect to the age at which they begin to walk. It is surprising therefore to find that this author presents no average, median or distribution for the age at walking of his subjects. Inasmuch as Hřdlička's data, which consist of communications from volunteer correspondents, have been published in full in his book the facts are available to anyone who will examine each of the letters.

I have been sufficiently interested to do this little task, which is chiefly clerical in nature. In compiling these data I attempted to find the age at first walking alone; that is, walking without aid from furniture or persons. Wherever possible the age at which the child took his first step was secured, although where this performance was not specified the age at "beginning to walk" was taken.

Not all of the letters contain the desired information. Data were ob-

tained for 217 children. The distribution of the ages is presented in table 1. This table shows the range of the age at walking to be from eight to twenty-four months. The average age proves to be 12.97 months.

If we compare this average with averages secured by roughly comparable methods of research by other investigators we find no support for the claim that the children who run on all fours are retarded in walking. Terman (5) found that the average age at which the first step was taken was 12.94 months for 565 of his gifted children. The average age at which "several steps" were taken for the same children was 14.12 months. M. E. Smith et al. (3) found the mean age at the first step for 109 Iowan children to be 13.47 months and for 725 children of various races in Hawaii 13.25. Only the average of S. Smith (4) for 831 Seattle children for "walking alone" (12.77 months) is slightly lower than the average of Hřdlička's group.

In view of the fact that differences in technique are present in the comparison of any two of these groups, it seems unwise to emphasize the differences between the means. Rather it seems amazing that the procedures which have been used should have secured results which are so nearly identical. The differences are very small in comparison with the difference found by Abt et al. (1) between dull and normal children. We must conclude that the children reported

by Hřdlička are not markedly different from unselected children with respect to the age at which they begin to walk.

TABLE 1
Distribution of ages at walking

AGE	NUMBER OF CASES
<i>months</i>	
8-8.9	1
9-9.9	9
10-10.9	20
11-11.9	29
12-12.9	60
13-13.9	32
14-14.9	30
15-15.9	14
16-16.9	8
17-17.9	1
18-18.9	8
19-19.9	2
.....	..
22-22.9	2
23-23.9	1

It seems to us that in raising the question of the age at walking of

groups of children with different kinds of pre-walking locomotor habits, Hřdlička has called the attention of psychologists to an interesting problem. In studies of walking to date we find that the onset of this behavior has been related to height, weight, intelligence, race, climate, sex, health, and nutrition but that the present topic has been completely ignored. With respect to the rôle that learning plays in the development of walking, the relation of walking to various kinds of practice would be particularly interesting to discover. It is curious that no one has attempted to find the influence upon walking of the "baby walker," for instance. While the habit of running upon all fours cannot be imposed at the will of the experimenter, there are doubtless many other pre-walking locomotor habits which the investigator can easily control.

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Performance of Children in Stutsman Tests

DATA, obtained from the administration of the Stanford Revision of The Binet-Simon Scale and The Minnesota Preschool Scale to young children at The Child Insti-

tute of The Johns Hopkins University over a period of several years, have recently appeared in this journal (1). It is the purpose of the present paper to present supplementary information

obtained during the same period from the same group of subjects regarding their performance on certain of the tests in The Merrill Palmer Scale.

In its revised form The Merrill Palmer Scale, (2) contains 93 items applicable to children from 18 months to 6 years. Tests range from the manipulative activities such as tower building, to simple language tests, such as repeating words or word groups. The final score, which takes into account both refusals and failures, is calculated on a point scale basis. By means of tables this raw score may be translated into a mental age equivalent, a percentile equivalent, or a standard deviation equivalent for each age level.

Stutsman in an earlier study (3) gives percentile scores for each age level for the individual tests. After the tests have been administered to the child, in order to successfully interpret the results obtained, the scores made by the child on any given test are compared with the percentile scores for his age level. This comparison shows whether or not his performance is better, equal to, or worse than the average performance for his age level as indicated by the tables.

When The Merrill Palmer Scale first appeared all the items suggested were given to the children of The Child Institute. As the problem of suitable tests for preschool children was at that time studied by the application of many types of tests the preliminary study indicated that a selected group of items from this scale would be of practical value.

The tests chosen from The Merrill Palmer group were:

- The placing of 16 cubes
- The nest of cubes
- The Wallin pegboard, A and B
- The repetition of words and word groups
- Questions
- The buttoning tests
- The pyramid tests
- Three trials of the Seguin
- The action agent test
- The little pink tower
- The manikin test

Since percentile ratings for each of these tests were given in the preliminary report by Stutsman a comparison of the child's score could be made with the ratings given in the tables.

With the exception of the four language tests (repetition of words and word groups, questions, and action agent) and the manikin, which are scored on basis of amount of work accomplished, scoring was entirely in terms of time. The child was allowed as much time as he desired for each task. It was found that Stutsman's generalization that "a time limit was not necessary because young children seldom work for long periods on tasks which are hopelessly too hard for them" was true in most cases.

Table 1 gives the data of the tests selected from The Merrill Palmer Scale as obtained from 83 cases at the Hopkins' Child Institute. For the individual tests the best, average, and worst scores are given for each age level. Failures are accounted for under the heading of worst score. The average score in each case means the average for those subjects passing the test.

It will be noted that the replacing of 16 cubes in the box, and the two peg-board tests were passed by all subjects

TABLE 1

This table shows the best, the average, and the worst score made by a group of 83 subjects on 18 items, selected from the Merrill-Palmer Scale. Tests 1 to 13 inclusive are scored according to time required; tests 14 to 18 inclusive, are scored according to amount of work done.

	AGE GROUPS											
	24 to 29 months		30 to 35 months		36 to 41 months		42 to 47 months		48 to 53 months		54 to 64 months	
	Number of cases in age groups											
	10 cases		9 cases		13 cases		18 cases		17 cases		16 cases	
	Score is in seconds required											
	Best	Aver- age	Worst	Best	Aver- age	Worst	Best	Aver- age	Worst	Best	Aver- age	Worst
1. Color cubes.....	43	99.6	170.5	45	91.8	157	42	85.5	295	11	70.5	201
2. Nest of cubes.....	9	47.2	120	12	24.7	3F	13	33.1	89	6	23.1	75
3. Peg board A (Wallin).....	18	25.3	35	10	19.7	24	11	21.8	40	10.5	18.3	34
4. Peg board B (Wallin).....	16	34.9	49	12	22.8	31	14	23.8	37	13	19.4	26
5. Buttons, one.....	220	341.3	7F	37	97.0	4F	6	27.8	3F	8	23.0	2F
6. Buttons, two.....	220	341.3	7F	114	147.3	6F	21	61.0	3F	18	41.5	2F
7. Buttons, four.....			10F			9F	64	125.3	3F	37	62.1	6F
8. Three cube pyramid.....	4	29.0	5F	5	8.0	3F	5	12.6	31	4	17.6	75
9. Six cube pyramid.....	145	175.0	8F	20	55.5	7F	21	34.1	5F	16	33.0	6F
10. Seguin, first.....	400	334.9	6F	162	240.5	5F	40	89.3	1F	39	113.6	1F
11. Seguin, best.....	114	214.6	6F	101	210.5	5F	36	70.8	1F	42	69.3	1F
12. Seguin, sum.....	537	295.6	7F	205	337.0	7F	123	280.2	1F	162	270.2	1F
13. Little pink tower.....	12	39.7	6F	13	37.2	6F	4	14.4	4F	7	14.1	3F
14. Repetition of words.....	4	4	1F	4	4	4	4	4	4	4	4	1F
Score is in points obtained												
15. Repetition of word groups.....	4	7.1	3F	14	11.6	1F	14	12.5	4	14	13.2	1F
16. Questions.....	10	6.5	2F	10	7.8	4	10	9.7	9	10	9.7	1F
17. Action agent.....	11	6.2	6F	14	8.7	2F	17	17.2	1F	19	14.8	3F
18. Manikin.....			10F			9F	5	2.6	7F	5	3.6	11F
												4F

Score is in points obtained

in each age group. There were three failures for the nest of cubes in the 30 to 35 month group. The buttoning of one and two buttons was consistently failed by some subjects in each group through the 47 month level. These same two tests were passed by all subjects whose ages ranged between 48 months and 64 months. The four button test was failed or refused by all subjects from 24 months to 36 months and was passed by all of the group whose ages ranged from 54 to 64 months.

The three cube pyramid was passed in all cases after 36 months. Successes were scored for each of the 16 subjects in the 54 to 64 month group on the 6 cube pyramid. There were no failures on Seguin after 48 months. Performance within the age levels was inconsistent on the little pink tower. The scores range from four seconds for a perfect performance to failure. The test was passed by all the children in the oldest group. The best score was made by a subject in the 36 to 41 month group.

Failure in the repetition of words and word groups and in answering the questions indicates in most cases refusal to respond in the prescribed manner. The failure, however, of the one subject in the 42 to 47 age level on each of these tests was made by a little Italian boy who spoke only a

few English words. He was tested again after three months in The Child Institute and passed the tests.

The range in scores obtained on the manikin are interesting. At each age level after 35 months the range of scores was from five (perfect) to zero (failure).

Because of the small number of cases, we are making no comparisons with Stutsman's percentiles. However, it does seem of some value to show the variations in test scores made by subjects in the same age groups since analysis shows that in many cases refusals and failures are not the result of lack of ability but of emotional conditions or other factors which present themselves in the testing situation.

The problem of the selection of tests applicable to children of the pre-school age requires a survey of many types of performance. Such studies seem to indicate that a large group of tests covering a wide range of situations is desirable for diagnostic purposes. This group of tests, chosen from The Merrill Palmer Scale, offers interesting results. When data obtained from them are combined with data obtained from other motor and language tests, they furnish a valuable source of information in the study of individual children of the pre-school age.

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